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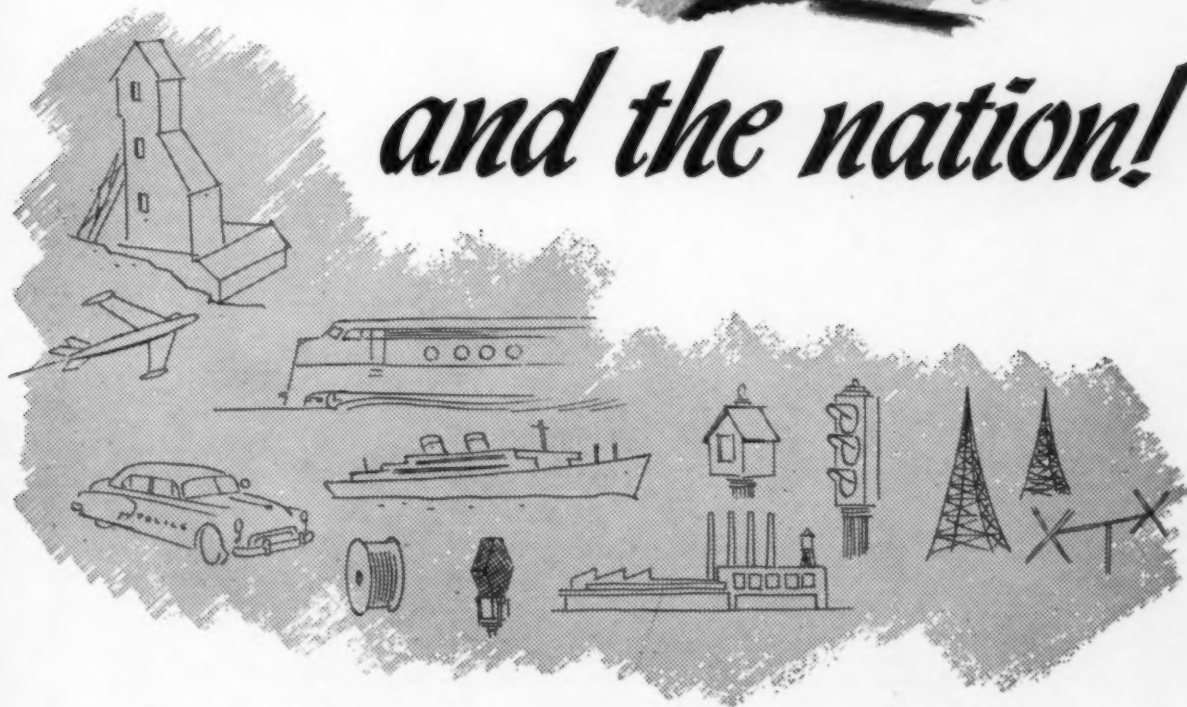
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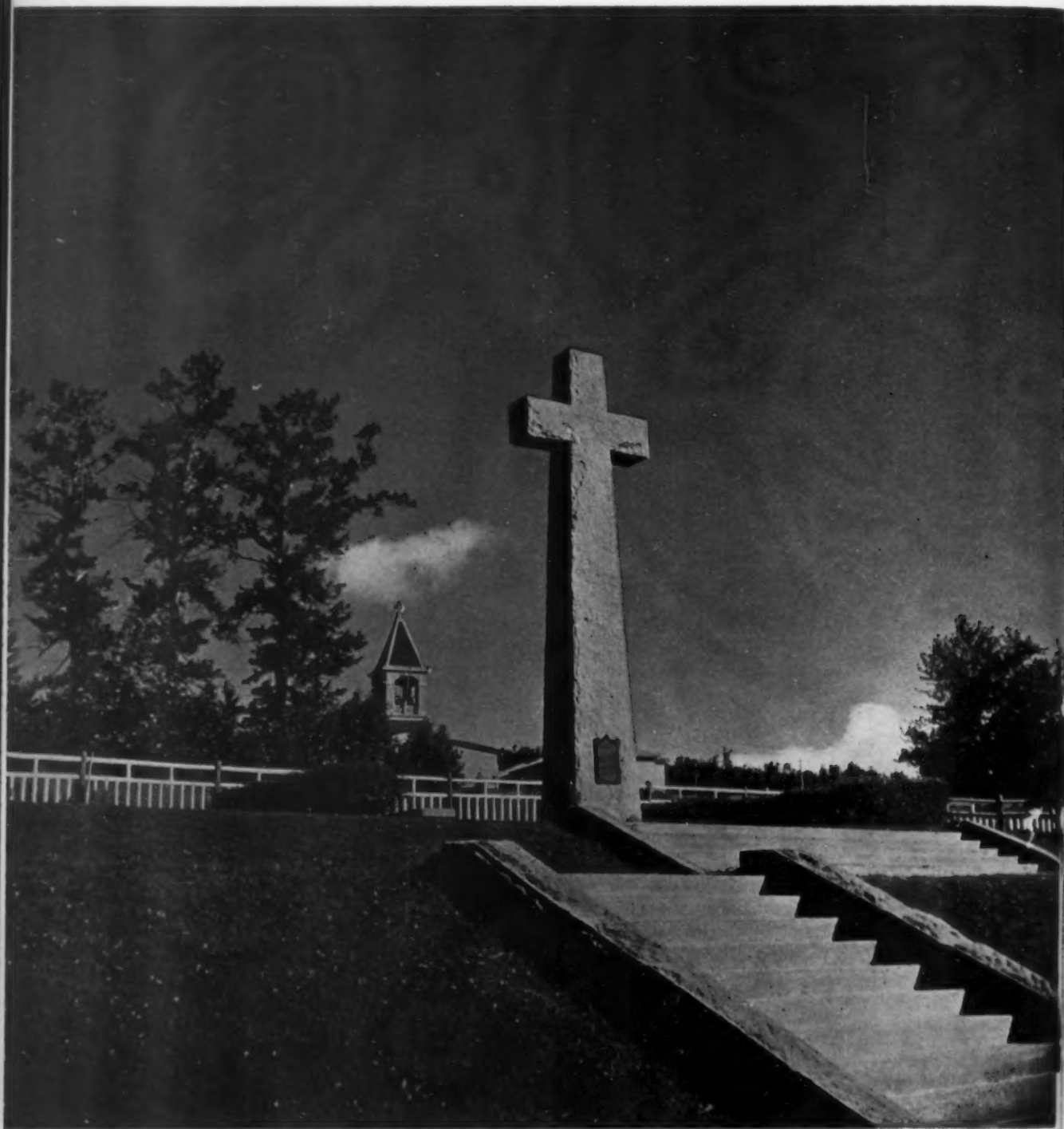


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The British standard of spelling is adopted substantially as used by the Dominion Government and taught in most Canadian schools, the precise authority being the Oxford Dictionary as edited in 1936.

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Toronto office — 21 King Street, E.
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Colour photograph by W. V. Crich

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Focus on Tropical Africa

by GEORGE H. T. KIMBLE

Photographs by the author unless otherwise noted.

Tropical Africa is a land of contrasts. A B.O.A.C. airliner forms a back drop for a not-so-modern "Miss Nigeria" at Lagos airport.

NOT THE LEAST remarkable thing about tropical Africa is that you can find there almost everything you expect to find. If you were reared in the Hollywood school of geography, you will probably go there looking for lions, jungles, and "savages", and you will undoubtedly find them. As a matter of fact your reception committee at the airport might include a pride of lions—before now planes have been unable to alight at one of the Kenya airports until the runway was cleared of animals that had strayed from the nearby national park. Nor can you very well miss the jungle—unless you stay north of the Sudan in which event the only trees you are likely to see will be in a mirage. To locate the "savages" may prove rather more of a problem since the African species of *homo sapiens* is really no more ferocious than the North American; however, if you are very nice, the chief of some obliging tribe will almost certainly organize a war dance in your honour, and see to it that you are given every opportunity of photographing

the performers in their most fearsome postures.

If, on the other hand, you were raised along more orthodox lines and read the standard textbooks on Africa, you will naturally look for inter-tropical fronts, lateritic soils, epiphytes, palm oil plantations and peanuts; and, again, you'll almost certainly find them—except the peanuts, about which not many people are talking these days!

The fact is, of course, that Africa is a very large continent, and that even tropical Africa is so full of so many different things that almost any statement made about it is at least partially true. But diverse and difficult of characterization as the region is, one thing at least is undeniable: it is changing—parts of it very fast. Take, for instance, the matter of transportation. Fifty years ago very few Africans had ever been outside their tribal limits. As a matter of fact, to do so, would have been to court censure, if not certain death. Today, it is not uncommon to find West Coast Africans work-



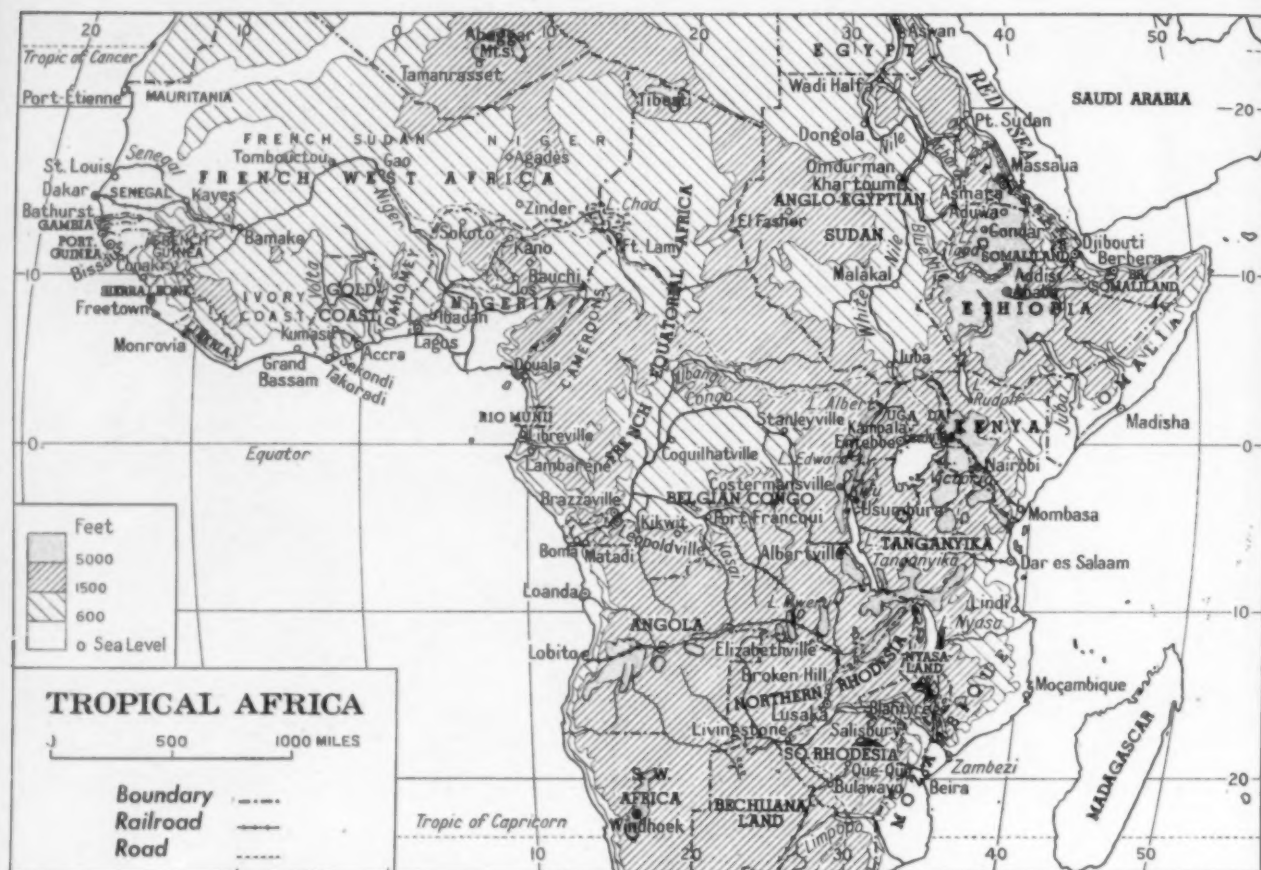
This is how every pound of cacao and bale of cotton is exported, and how every motor car, piece of machinery and passenger comes ashore at Accra on the Gold Coast.

ing as clerks in Belgian Congo offices, and Sudanese houseboys employed in Nairobi. There are even some college students who live so far away that they spend nearly three months out of their four months' long vacation getting to and from their homes—if they don't make their canoe connections, they may not get home at all!

As can be readily imagined, this increased mobility is not without its drawbacks. In the first place it has helped to bring about a disruption of the old tribal system of life which derived no little part of its authority from the fact that the chiefs could, quite literally, keep their eyes on everybody. In the second place, the fact that people can now travel by truck over the length and breadth of most of the inter-tropical colonies, at a cost of a penny a mile, means that far too many of them are tempted to live by their wits in the towns where African housing conditions are generally poor, sanitation inadequate, and the incidence of ven-

ereal disease appalling. To make matters worse, the supply of floating labour in these towns is frequently in excess of the demand. In the third place, the footloose African, finding himself bereft of his dignity and compelled by his illiteracy and other handicaps to remain peripheral to the core of urban life, becomes a ready prey to every kind of propaganda, and an easy dupe of the purveyors of cheap Utopias.

But naturally there is another side to the picture. The bicycle, the automobile, the bus, the railroad and the aeroplane that made the new mobility possible, have also made it possible for the African, as well as the European, to get about the country much faster. And nobody can doubt that, on balance, the influence of these agents of western culture has been salutary. Thanks to the bicycle, many a Nigerian bush farmer can get his surplus crops to the city market while they are still in a salable condition. And the commodities thus carried to the



market range all the way from cattle (alive at that!) to 200 sacks of kola nuts, bales of cotton, churns of milk and firewood.

Thanks to the motor car, district commissioners can now cover in one day distances which, formerly, would have taken upwards of three weeks. (Whether they are better administrators on that account, is perhaps a moot point.) Similarly, tutors attached to the extra-mural departments of the various university colleges now think nothing of conducting four weekly classes involving a round trip of 600 miles or more; during the current academic session, the extra-mural department of the University College of the Gold Coast alone is operating some sixty such classes scattered all over the colony. The impact of the automobile on the commercial life of the tropics has been equally far-reaching. Twenty years ago, the typical West African fishing village could export nothing but dried fish, and precious little of that. Today there are a couple of

fishing villages near Accra which, between them, need a fleet of forty trucks to handle all their business, and some of the trucks operate as much as 300 miles up-country.

Thanks to the aeroplane, perishable vegetables and soft fruits (including strawberries) picked at dawn on the eastern highlands of the Belgian Congo can be eaten the same day in Leopoldville a thousand miles away—that is, provided you are prepared to pay the price, and the air freight alone is some 25 cents a pound. Medical services have likewise improved by leaps and bounds since doctors took to travelling around by air. A friend of mine in Nairobi thinks nothing of paying a 150-mile visit to a patient between tea and dinner and charts a plane just about as nonchalantly as most of us would ring for a taxi. (For a woman to know that her children can be treated by a top-flight paediatrician at the first sign of an ailment takes quite a few tears out of life in the tropics: unfortunately it also takes quite



Group of Hausa merchants in an Accra (Gold Coast) market — carrying on "business as usual" beneath their simple shelter.

Gold Coast fishing by a primitive, but seemingly efficient, method. These are the fellows who need a fleet of forty trucks to handle their business.





Above: — Part of the commercial district of Leopoldville, capital of the Belgian Congo.

Below: — A Leopoldville building. The ground floor contains shops, the first storey living quarters, and the upper part is air space.

Belgian Congo Information Service.



Below: — Huts of this style are adopted by Sudanese immigrants living in suburban areas of East African towns.



a few dollars out of the pocketbook.) To the advent of the aeroplane we also owe, in large degree, the extremely effective control measures now regularly in force against malaria and crop pests, including the locust.

Not the least important result of this greatly increased ease of movement is that very few parts of Africa now remain outside the orbit of Western influence, and the play and counter-play of Western ideas. Anthropologists in search of "untouched" tribes are having a tough time, and explorers looking for head hunters are almost out of business. The lake in which a former Kabaka (i.e. king) of the Buganda people threw his enemies to be devoured by his pet crocodiles is today used by his Cambridge-trained grandson as a swimming pool!

All this is not to say, however, that the old order has passed away. There is still plenty of the primitive about tropical Africa. A five-minute walk from Makerere College in Kampala is really an excursion into history.

In place of modern, ranch-style homes possessing far more amenities than the average prairie farmstead (I even saw one house with a full-sized tennis court on its roof), there are only the rudest of mud huts devoid of windows, fireplaces and furniture. From the ill-lit interior of one will issue the plaintive melodies of a Buganda love song—melodies that were already ancient when the first Africans reached the Americas. From another will come the rhythmic thud of the long-stemmed wooden pestle as the woman of the house pounds out the daily ration of cassava in her mortar-like bowl. From yet a third comes the muffled beat of a "talking" drum, and from a fourth the bleating of a kid that has already discovered hunger to be its birthright.

Nor is it always necessary to go outside the city limits to be made aware of the co-existence of two worlds. The *sagia* and the *shaduf*, the two most commonly employed water-lifting devices of the Nile Valley, both

A typical bush hamlet near Kampala and Makerere College — intellectual centre of East Africa. Crops include papaw, mango, corn, cassava, and plantain.





The saqia, near Khartoum. Water has been raised this way since the time of the pharaohs — but tin-can dippers have replaced goat-skins.



of which were undoubtedly in use in Bible times, can still be seen and *heard* (for there can be few more excruciating sounds under heaven than those made by the greaseless, wooden cogwheels of the *saqia*) in the administrative heart of Khartoum, and before now I have seen traffic diverted from one of the main streets of Accra to enable a group of Gold Coast Africans to perform a pagan fetish dance.

But even in this respect things are not what they used to be. Quite likely the fetish dancers came into town in their own station wagon, since many of them are well-to-do. Equally likely the owner of the furnitureless hut rides to work on a spanking three-speed bicycle; while it is quite possible that the singer of the Buganda love song could, for a consideration, offer you a rendition of a Bing Crosby or Vaughn Monroe number, since dry battery radio sets are to be found even in the deepest bush; and as for the

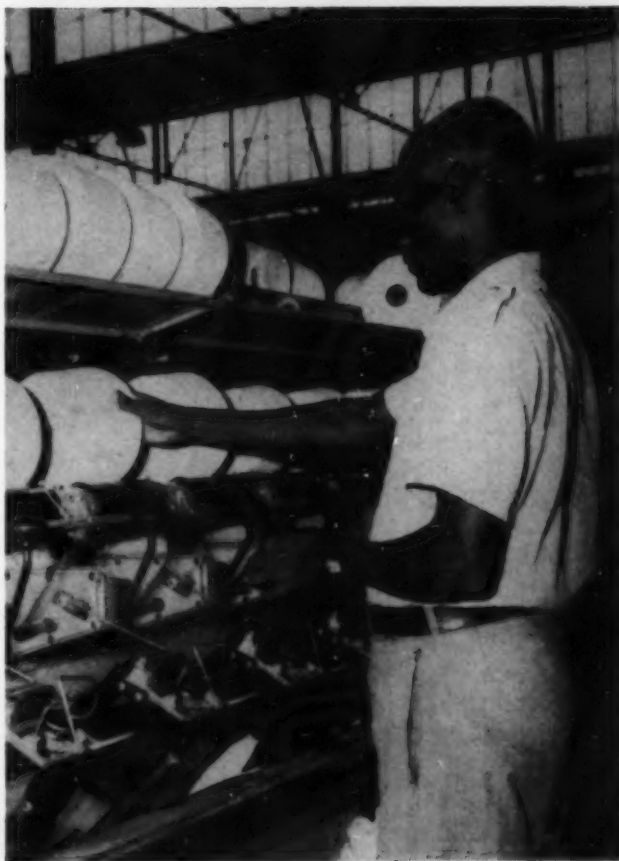
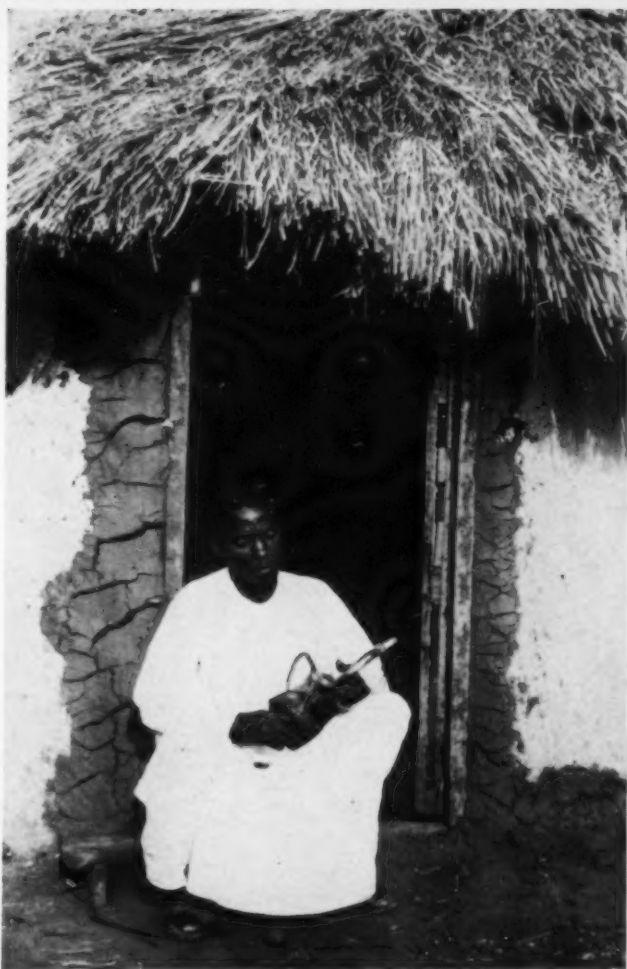
The shaduf, an even more rudimentary irrigation device which still uses a goat-skin container — but secured by the rim of a bicycle wheel.

African musician with his one-stringed "fiddle" sitting outside his windowless, furnitureless hut.

native drummer, he might well prove to be just as much at home on a trombone.

What it all means, in effect, is that the traditional self-sufficiency of African life is being destroyed. Needless to say, you can find communities that still live exclusively "off the land", that have no bicycles, trombones or radio sets, where a white man is still an object of curiosity, where a camera is regarded as a species of magic, and where the children have not yet learnt to ask for or expect baksheesh. But such communities are usually not to be found within 100 miles of a road, airfield or railway and so are comparatively uncommon even in the supposedly backward parts of the continent. What surprised me most about a thousand-mile air traverse of the Belgian Congo was not the extent of the forest or savanna, but the extent to which both were served by highways.

Symptomatic of the cultural change that is coming over the face of tropical Africa is the rise of the village store. Thirty years or so ago, if you wanted to buy anything, you had to go to the big towns. Now almost every settlement that has a name has a shop where it is possible to buy, not only the produce of a region, such as oranges, plantains, cassava and sugar cane, but also such imported goods as toilet soap, patent medicines, cigarettes, cottons, razor blades and umbrellas. And, judging by the evidences, there is a lively demand for such goods. Thus, it is by no means uncommon to find that the shopkeeper runs a car, or even a bus service, and that his children go to college. And the demand is growing, at least in all those places (and there are many) that have been drawn within the orbit of cash-crop farming, mining and industrial enterprise. In the cacao belt of West Africa, times were never so good. In 1948 the sale of cacao brought the farmers of the Gold Coast and Ashanti the sum of \$65,000,000. With the price of cacao still advancing and the "swollen shoot" disease for the most part under control, the prospects of yet larger cash returns are distinctly bright. Much the



Winding cotton in the Utexleo textile factory at Leopoldville, where fabrics are produced from locally grown cotton. The machinery is British.

Belgian Congo Information Service.



Cacao bush in the Gold Coast. In foreground, the dead tree is cacao with "swollen shoot" disease. Nearby much more cacao is growing in complete immunity.

same is true in the cotton belts of the Gezira (in the Anglo-Egyptian Sudan) and Uganda, and the palm oil districts of the Belgian Congo. In the rapidly expanding mining centres, as for instance, Elizabethville in the Belgian Congo, and in the vicinity of such large commercial and administrative centres as Khartoum, Kampala, Leopoldville, Lagos and Dakar the demand for imports requires more than the resources of the village store to satisfy it, since many of the better-to-do Africans are cultivating a taste for Western-style clothes, foods, drinks, house furnishings and kitchen equipment.

As can be imagined, this economic revolution, and it is nothing short of a revolution, has its disturbing aspects. Many native skills are dying for want of exercise. In some

tribal districts wood-working is a lost art. In others it is rare to find a skilled potter; indeed earthenware pitchers and pots are now so seldom seen near the towns and highways that one is often tempted to nominate as the symbol of twentieth century Africa a cast-off tin can (for every woman and child seen carrying water in a jar, you will see a dozen carrying it in a gasoline container). And the tourist in search of metal ware may sometimes find that what purports to be a nice specimen of Hausa inlay work carries a continental trademark. But maybe we tourists have only ourselves to blame for this sharp practice: away from home our shopping manners are not always too elegant.

Unfortunately it is not only the crafts that are suffering; in some instances the people themselves are poorer, at least in health and general well-being. Long-flowing cotton dresses may become the womenfolk of Africa (for by middle life most of them have lost their figures), but it is open to the gravest doubt whether they are as hygienic as the more abbreviated attire formerly worn. For six to eight months in the year the skies are capable of deluging them without warning, and without prospect of "redress". Could it be, perhaps, that the alarming incidence of tuberculosis and other respiratory troubles in the humid tropics is linked with the westernizing of African wardrobes? It is likewise questionable whether the replacement of straw-thatched roofs by galvanized iron is in the African's best interests. Admittedly the iron lasts longer and is not inflammable, but it gives rise to well-nigh insufferable room temperatures during the daytime and to equally insufferable noise during the rainy season—and the vehemence of tropical rains has to be *heard* to be believed.

A third and related change that cannot fail to impress the traveller is the growing awareness by all concerned—not least the African—of the potentialities of the inter-tropical lands. These potentialities are, of course, of many kinds.

In the minds of most white people, it is doubtless the economic potentialities of the

Cacao seeds, or beans, are scooped from the ripened pods and left for a few days to ferment. They are then spread out to dry in the sun. In the Gold Coast they are spread on light bamboo mats raised from the ground, as shown in this picture of a farm at Tafe. Labourers stir the drying beans hourly by hand. Slow, even drying, which may take up to ten days, produces the best results. In the Gold Coast the cacao farms are owned and managed by the native people.

U.K.I.O. photographs



The dried cacao beans are sent to the buyer's store, whence they will be shipped across the world for manufacture into the cocoa of beverage form. Gold Coast cacao is shipped in bags of "Accra weight" which is 140 lb. net.



Hydro-electric works at Mwadingusha in the Katanga district, south-eastern part of the Belgian Congo.

Ruby d'Arsehot

region that loom largest, and they are unquestionably great. Even a mere enumeration of the leading minerals is impressive: uranium, diamonds, gold, copper, cobalt, manganese, bauxite, coal, iron ore, lead, tin, vanadium, chrome, mica, asbestos and phosphate.

But it is the magnitude, rather than the diversity, of the mineral deposits that gives them such tremendous economic meaning. The diamond mines of Tanganyika are now affirmed to be the largest in the world—even larger than those of Kimberley in South Africa. The uranium deposits of the Belgian Congo may not be the largest in the world, but certainly everybody living there thinks they are, and there can be hardly any question but that the present uranium output of the Katanga district exceeds Canada's.

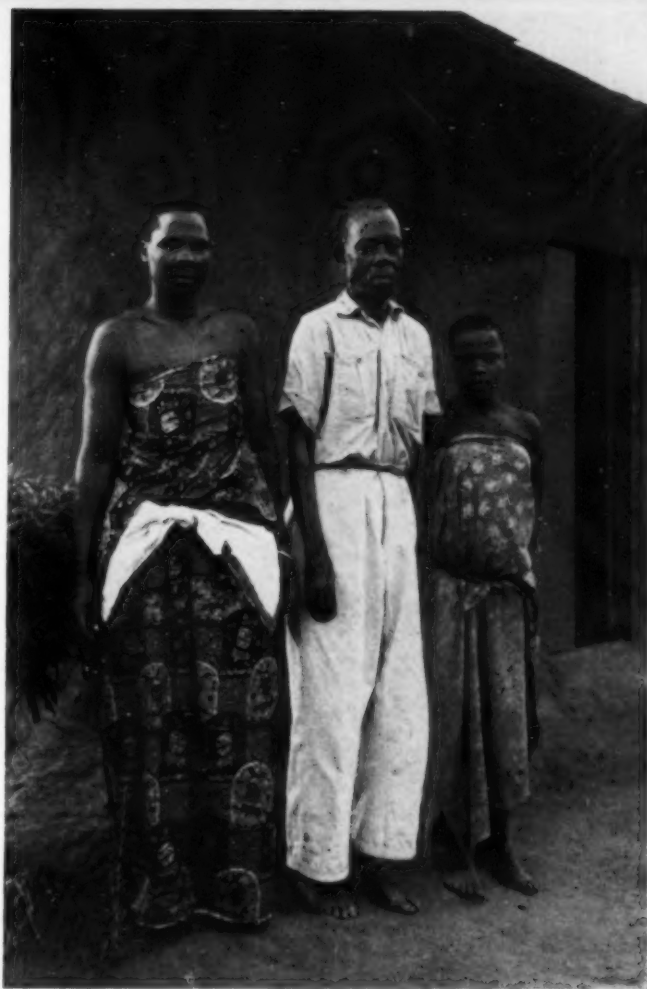
The Katanga-Northern Rhodesian copper mines are currently producing about 17 per cent of the world's total, or about twice the Canadian output. When the Kilembe field at the foot of the Ruwenzori Mountains in Uganda comes into production, tropical Africa's contribution to the world's supply of this critical metal may very possibly be doubled. Eight million tons of good grade ore have been proved already and, according to Dr. K. A. Davies, Director of the Geological Survey of Uganda, more and more is being pulled out every day. To use his own words: "There's no peanuts nonsense about the Kilembe copper deposits". As for iron, there is enough high-grade ore in Northern Rhodesia (near Lusaka), Southern Rhodesia (near Que Que), Liberia (in the Bomi Hills) and in Kenya (in the Elgon-



Handicrafts are giving way to factory products but this young ivory worker still plies his craft at Omdurman in the Anglo-Egyptian Sudan.

Tororo region) to take care of the needs of the entire continent for generations to come. The bauxite deposits of the Gold Coast are such that an annual aluminum output of not less than 750,000 tons is being envisaged for the Volta River project alone. The situation is scarcely less favourable when it comes to: (1) tin—in recent years the Belgian Congo has been producing anything from 10 per cent to 15 per cent of the world's total and Nigeria from 5 to 10 per cent; (2) chrome—Southern Rhodesia and South Africa between them account for more than one-third of the world's output; (3) manganese—the Gold Coast is shipping at the present time nearly 20 per cent of the world's total, and (4) cobalt—75 per cent of the world's output nowadays comes from the Belgian Congo and Northern Rhodesia.

True, coal is short in many places—only Nigeria, Tanganyika and Southern Rhodesia have sizable workings at present, and oil is almost non-existent, but there is an absolute superfluity of water power, much of it well located with respect to urban and industrial requirements. The estimated hydro potential of the Belgian Congo is 130,000,000 horsepower—approximately five times as large as Canada's; that of French Equatorial Africa, 50,000,000 horsepower, while the total for inter-tropical Africa is of the order of 250,000,000 horsepower—well over one-



A Buganda (Uganda) tribesman with his womenfolk.



Baskets have been woven in this way for the past thousand years. This girl demonstrating her skill lives some fifty miles from Kampala, Uganda.



third of the water-power potential of the entire world.

But minerals and fuels, important as they will be to the continent and the rest of the world, do not by any means constitute the full tally of Africa's economic resources. In the long run they may not be as important to her as her renewable assets. Already the African tropics are a major world producer of vegetable oils (from palm oil, coconut and sunflower), cacao, cassava and grain sorghums, and could well become a major producer of citrus fruits, bananas, sugar cane, corn and peanuts. Given the control of the tsetse (the situation is much better than it was) and the improvement of native stock and pastures, there is little reason why meat should not be added to this list. Indeed the highlands of East Africa are already producing high quality beef and mutton (there are more sheep in Kenya than in Canada), and the so-called Highland hams can stand comparison any day with those cured on

this side of the Atlantic. In the matter of industrial crops, the African potential is no less great. The area now given over to rubber, sisal, cotton and pyrethrum, to name only four commodities that are in great and seemingly insatiable demand, could, at a conservative estimate, be expanded fiftyfold without seriously interfering with the African's traditional cultivation techniques.

Then again, there are the tropical forests which, in round figures, occupy one million square miles—without doubt the greatest under-exploited resource in the entire continent. Apart from teak, mahogany and some other cabinet woods, these forests have so far contributed little to the world's lumber market, and nothing to the pulp market. However, having in mind, firstly, the rapid shrinkage of our middle and high latitude forests, secondly, the recent development of the "chemigroundwood" process whereby it is now said to be possible to produce pulp from hard woods more cheaply than from soft woods, thirdly, the availability of cheap hydro-power and, fourthly, the exceedingly rapid growth of trees in low latitudes, it can hardly be doubted that the forests of tropical Africa will become the focus of increasing commercial attention and, perhaps, even the scene of large-scale integrated forest industries producing not only pulp and newsprint, but cellulose, plastics, wood sugars and alcohol, acids, insecticides, paints, lubricants and foodstuffs.

That the countries of tropical Africa are aware of their economic heritage, and are determined to do something about it, is in evidence on every side. Wherever the traveller goes, he not only hears of plans for new factories, surveys for new roads, railways and power sites, but sees new manufacturing plants, mines, agricultural and forestry research stations, highways, air fields and, indeed, whole new towns. In Uganda, the power and manufacturing developments currently taking place in and around Jinja promise to treble its population in the next ten years and make it the industrial capital of British East Africa. Sugar refineries, cotton ginneries, phosphate and nitrogen-fixing

plants are already operating within a hundred miles of the town; textile, soap and rubber factories will soon be added, and plans are well advanced for the building of a copper smelter and a blast furnace. Matching this, and likely to surpass it ultimately, is the industrial development under way in the Que Que district of Southern Rhodesia. Hereabouts is found coal capable of being worked open-cast fashion at little more than a dollar a ton, iron ore, chrome, limestone, asbestos, mica and copper. A more auspicious association of the basic ingredients of modern metallurgical economy could hardly be imagined, and it occurs, withal, in one of the most salubrious spots of central Africa. In West Africa, industrial developments have so far been on a more modest scale, but in the aggregate scarcely less significant. In Takoradi on the Gold Coast, a cocoa butter factory capable of handling 5,000 tons of cacao annually is now operating. In Nigeria the government has set up a number of mills for the processing of palm nuts into oil, cattle cake, and meal for human consumption. In the same country several modern textile plants are working to capacity; the cloth may be coarse, but it is cheap and the Africans love it. Other new enterprises include the making of jam and confectionery, the canning of fish, fruit and meat, and the manufacture of plywood, veneers and furniture. What is more, they are gathering momentum yearly, and likely to go on doing so with the growth of political self-consciousness.

Which leads us to observe, finally, that it would be a gross miscalculation to think of the potential of tropical Africa solely in economic terms. There are other yardsticks by which it should also be measured.

In the minds of a fast-increasing group of educated Africans, it is the political potential of their lands that is undoubtedly uppermost; and not in their minds only. In the Anglo-Egyptian Sudan, Nigeria and the Gold Coast, the air these days is full of talk of the obsolescence of colonial rule and the right of African peoples to self-government. In the recent (February, 1951) Gold Coast elections no less than 34 of the 38 seats being contested went to the Convention People's Party that wants self-government *now*. Sooner or later (and it may very well be sooner rather than later), these and other African countries will assuredly follow in the train of Pakistan, India, Burma, Indo-China and Indonesia. Meantime, it is devoutly to be hoped that the countries of the free world will realize that not the least valuable contribution they can make to the promotion of the political well-being of these lands is through the medium of honest trade, investment and cultural exchange. The appointment of Canadian Trade Commissioners is certainly a move in the right direction, and one that is warmly welcomed by all the countries concerned, but could not more be done to increase the African's awareness of the intellectual and spiritual values that are at once our great inheritance, and our hope for the future?

Nigerian wedding party: the musician, the Yoruba bride, the unhappy-looking youthful bridegroom, and the bridesmaid.



African Career Woman

U.K.I.O. photographs

LEAH GEORGE is a remarkable woman, and she is one of the women who demonstrates the spirit of modern Africa. She is second in command of a maternity hospital in Nzega, a small district headquarters in Western Tanganyika. A European sister is in charge and at her right hand stands Leah George.

Leah George's home was in Northern Rhodesia and some years ago she made a great decision which involved a complete break in her life and a very unusual one for an African woman: she decided to become independent and earn her own living. She enrolled as a probationer at Nzega and quickly found that she had a real sense of vocation for nursing. After graduating she spent many years in small bush stations teaching and training African women.

After some years of independence and responsibility she heard that in Uganda, which was educationally more advanced than Tanganyika, there was a three-year course in midwifery. Such a course would give her greater knowledge and prestige. The teaching was in Luganda, a language Leah did not speak, but so keen was she that she



learnt the language and went back to school for three years. She gave up her independence to become a pupil again, with a small amount of pocket-money each week, but she persisted and completed her course.

Leah is in direct control of her African staff of women and she looks after their teaching as well as the running of the hospital. She has gained the trust and affection of native women for miles around and the fact that local chiefs bring their wives and families to the hospital is her highest testimonial. Leah's husband is a clerk at the hospital and they have one child.



Constant supervision is the key to efficiency when new students take up hospital work. Leah George (left) makes constant inspections to ensure that the work is up to her high standards.

Leah George heads a new shift of nurses taking over their duties in the morning.



A Chief brings his family to Leah for medical attention, proof of the standing of the hospital in native eyes.

After a twelve-hour day, Leah goes home to prepare a meal for her own family—husband and son.





Haida sea-going canoes photographed on a ceremonial occasion in 1900. These dugouts might be 60 feet long and would carry some forty people and their equipment.

Photograph: Curtis, Seattle

British Columbia's Dugout Canoes

by SYLVA ROBERTSON

OUTBOARD motors and factory-produced boats of all kinds have replaced the primitive dugout—but there is romance in the story of its usefulness when the pioneers were exploring British Columbia.

Centuries seem to stretch between today with the bustling airport at Vancouver and that other day when travel was by canoe. Yet this story was told by a survivor of those old Crown Colony days before British Columbia joined Canada. He is J. C. Maclure, British Columbia's oldest living native son, who learnt dugout building from the Indian craftsmen of the 1870's.

A younger generation has forgotten the craft. Yet in Mr. Maclure's boyhood days life itself was dependent upon the canoe. The

forest was so dense, the entangled undergrowth so heavy, that overland travel was almost impossible; only occasional Indian trails led among trees so gigantic that their immense columns reached up two hundred feet or more before their branches whispered to the clouds.

The cedar furnished an ideal wood for building dugouts, the trees being sufficiently large to make sea-going canoes sixty feet or more in length, capable of carrying fifty men. This wood was soft and easily worked yet it was, at the same time, very resistant to decay.

With no written language the Indian could not record his ideas and discoveries for future generations. Yet he developed a peculiar art

BRITISH COLUMBIA'S DUGOUT CANOES

of his own—that of steaming and bending native cedar—an art handed down from father to son by long and careful tutelage.

"How the early craftsmen preserved uniform lines with practically no tools is a mystery," said Mr. Maclure. "As an artist paints his picture by eye, so did the coastal Indian shape canoes entirely by eye measurements. His work was a combination of the woodsman and the creative artist, for he seemed to think with his hands."

The Indians had no means of turning wood before steel tools came, yet with an adze and a hammer they fashioned from a single tree a vessel unexcelled for beauty of line and swiftness of motion. It is true that the South Sea Islanders ventured hundreds of miles in their craft, but they were dependent upon the out-rigger to keep their smaller boats from tipping over. The dugouts of our West Coast were laterally symmetrical about the centreline and floated in true balance.

The chief qualifications for success in this

once vital industry were patience and an eye for line. Given these, the craftsmen seemed to instil into adze and log some sort of magic. To make an adze, the early Indian used to cut pieces from boulders of native jade and fashion them into workable fragments by tedious rubbing with bars of sandstone.

When the Indians set out to choose a canoe-tree, they used to carry their fire with them, according to August Jack, Chief Kahtsa-lano. "Before whitemens taught us flints were quicker, we made fire with fire-sticks, and carried it with us in canoes everywhere we go," he said. "The way theys do is this: they get cedar stick and twirl in hole in round flat stone; roll it between hands, it get hot; the cedar grinds, and the dust glows. Then under the hole theys have a pile of cedar bark dust, little bits red-hot dust drop from stick through hole on little pile; you get fire, theys blow when smoke comes.

"Theys have a little thing like a tent, few inches high, but long only no ends, and they

Indian dugout canoes on the beach at Victoria, B.C. about 1880.

National Museum





This chief at Kingcome Inlet, B.C. is one of the few remaining Indians who know how to build a dugout.



Shaping and hollowing out the cedar log is a laborious process.



Steaming the dugout. It would be covered with cedar mats or canvas.

E. W. Christmas photographs

BRITISH COLUMBIA'S DUGOUT CANOES

put in bow of canoe, then put cedar dust in it, and the fire in it. When the canoe go along, the wind blow through tent, and keep fire burning all the time. When they get to camp, fires ready; save lots of work."

The first step in dugout-building was to chop a hole into the heart of the chosen cedar. If it proved sound, it was felled by burning. After the log was chopped to the length of a canoe the outside was adzed to the shape desired and it was towed to the village. It was then hollowed out by an adze, cutting it wide in the centre, while tapering the ends into a high bow and stern. The thickness of the sides, say two inches, was judged, either by running the hands over the outside and inside and noting irregularities, or by inserting a spike in the end of a stick so that it projected two inches. Having first made several horizontal markings along the length of the partially hollowed interior, small holes were drilled along the sides at the point of each marking. Then began the long and arduous business of chipping away until, when the stick with its two-inch projection was put through each hole in turn from inside, the point could be felt on the outside. This simple "trick of the trade" was adequate, and in the finished canoe all the small holes were neatly plugged.

Then came the feature unique to their craft, that of bending the dugout without



Adding water to the hot stones in the steaming dugout. This and the three preceding pictures taken at Kingcome Inlet.

E. W. Christmas

Pressing out the sides of a dugout that has been softened by steaming.

National Museum





Descending the Skeena River from Hazelton in a dugout, in 1900. National Museum

any tools. The canoe was given a greater width than the diameter of the tree from which it was made by partially filling it with hot water that was kept at boiling point by repeatedly dropping in hot stones and covering it with cedar mats. The steaming action, which softened the wood, made it possible to spread it from, say, a four-foot beam to a five-foot beam.

To obtain correctly symmetrical contours for the dugout, which was pliable during the steaming, measuring was done with sticks. Following the adzed-out shape, and relying on his extremely keen and true vision, the craftsman repeatedly "sighted" along the canoe, fore and aft and amidships and, cutting sticks to the required length as he slowly and carefully widened it to the desired ultimate spread, he forced these in horizontally at point after point. When each in turn could be readily removed it was replaced by a slightly longer stick, and so on until the maximum width was achieved. This operation required great care and skill, and the knowledge with which the timber had been selected contributed to its success or failure. The bow and stern were made in separate pieces and added to the canoe.

Mr. Maclure recalls how cedar or maple were chosen with the same care, to carve paddles. They were hand-cut in the straight grain of the wood and so were stronger than factory-made paddles. The coastal Indian would use a pointed paddle-blade. Along the Fraser, where they were used like poles in hugging the banks to fight the deadly current, the blades were even more pointed. When Mr. Maclure was a boy of ten he used to paddle alone on the Fraser for seven miles from Matsqui to Mission to get the mail—fighting the current for two hours to gain the last two miles. A strong paddle was essential in those perilous waters.

Gone are the days when the canoe-maker spent a month or two in fashioning a dugout. It is now a dying art for the coastal Indian prefers the chug chug of the motor-boat and so discards his canoe and paddle with his bow and arrow.

The last of the dugout specialists in the Lower Mainland was Hi Yi Glease of the Cowichans. He belonged to a family who specialized in this craft for generations. When the Great Northern Railway pushed its construction across his squaw's land near Sumas, she was paid several hundred dollars

BRITISH COLUMBIA'S DUGOUT CANOES

compensation. Discovering that it was more exciting to buy things than to make them, she lost interest in creating baskets to her own designs. Her money was spent in high living and she would not make camp near the dugout which Hi Yi Glease was then building. He began to brood as the younger Indians passed him by on their way to the gas station. The blows of his adze were silenced by intruding steamshovels; great trees were felled to make way for the iron horse. Frustrated, he fled, abandoning his dugout—the last genuine old-type dugout ever heard of in the Fraser Valley. He and his squaw set out for Cowichan in their boat to squander their remaining four hundred dollars. They were never seen again and were believed to have been murdered, for their

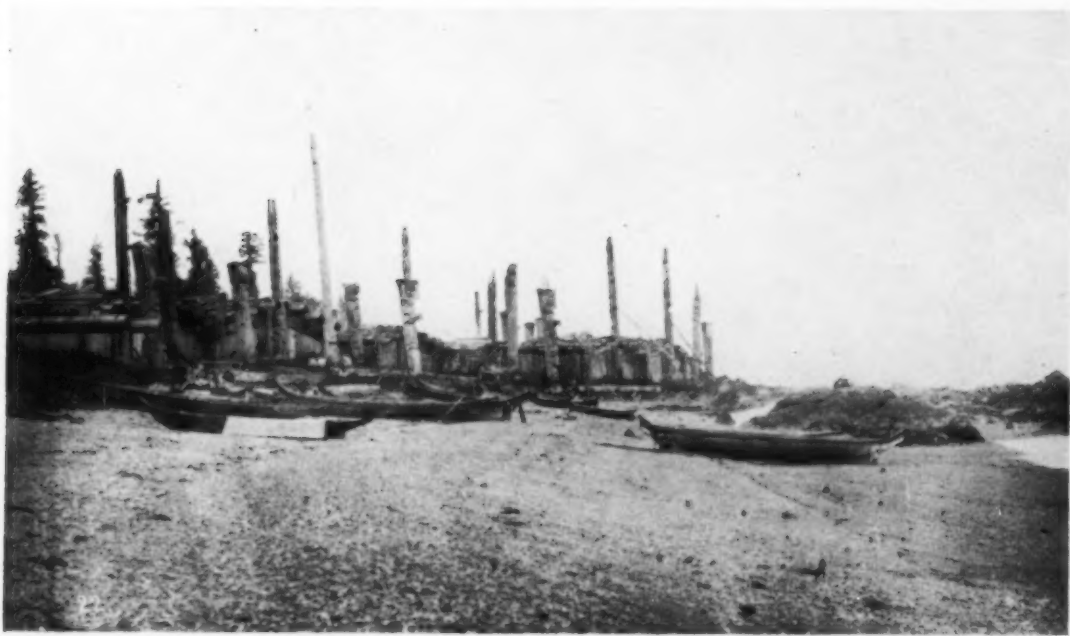
boat was found adrift, with only her hat in it, torn to shreds.

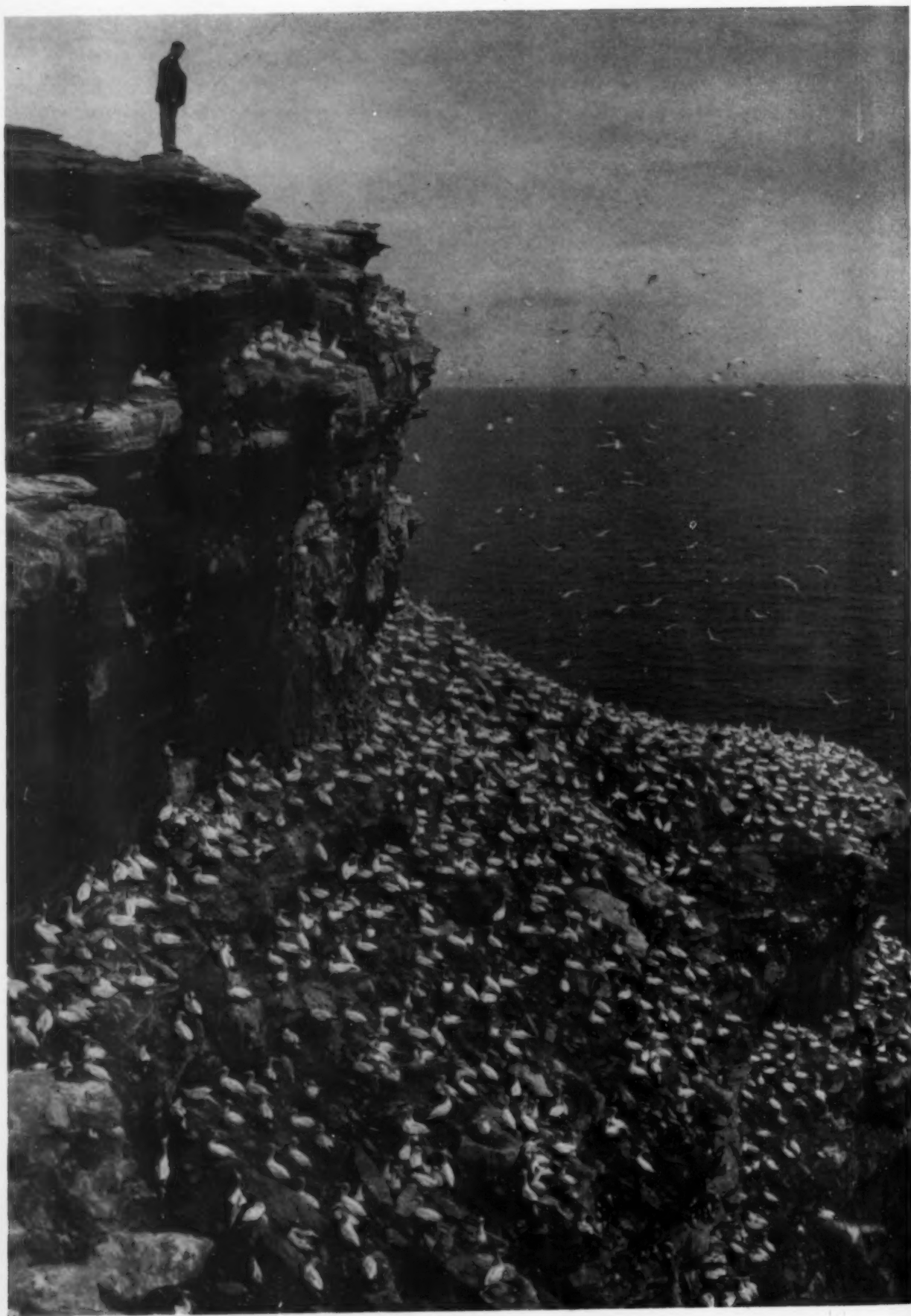
The last link in the chain of these master craftsmen which went back for many a generation vanished, and with him the secret of the swiftness of the dugout. This was the remarkable craft that enabled the warlike Haidas to make raids in force from the Queen Charlotte Islands all down the Pacific coast.

Only a few older Indians remain who understand dugout building, living out their twilight years on reservations. The work of their hands has almost disappeared, being replaced by factory-made canoes as far removed from their ancient craft as the reservations are from the wild, free forest they once called their hunting-ground.

Canoes beached at Tanoo, July 1878. This Indian village in the Queen Charlotte Islands has long been abandoned and little remains of the decorative house-posts and totems to be seen in this early photograph.

National Museum







Great Bird Rock with its lighthouse and North Bird with its gannet colony. Cartier landed on the latter as he could find no way to the top of Great Bird, which now has a set of steps.

Winged Republic

by LYN HARRINGTON

Photographs by RICHARD HARRINGTON

ISOLATED FROM the Magdalen Archipelago by twenty-two miles of treacherous cross-currents are the lonely Bird Rocks of eroded red sandstone and limestone. There are three of them—two small crags and Great Bird Rock, the latter a plateau rising about 150 feet above the sea, and some three acres in extent. The islands lie directly in the path of Gulf of St. Lawrence shipping, but no wrecks have occurred on them since the lighthouse was erected in 1870.

When Jacques Cartier arrived there on a calm June day of 1534, clouds of snowy birds wheeled and screamed around their "winged republic", as Cartier* described such bird colonies.

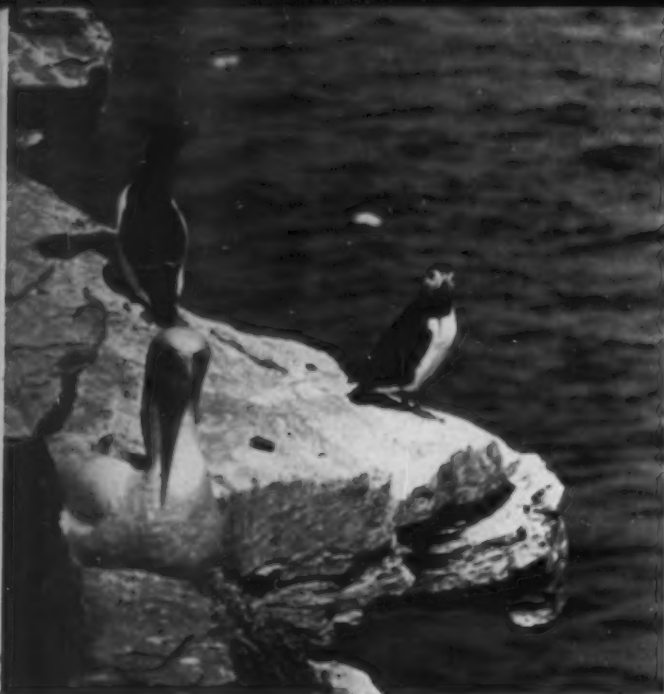
"We came to three islands, two of which

were small and steep as a wall, so that it is impossible to climb to the top. Between these there is a narrow passage." Today one of those islands has been eroded into a reef, and the second of the North Bird Rocks has been worn into two crags.

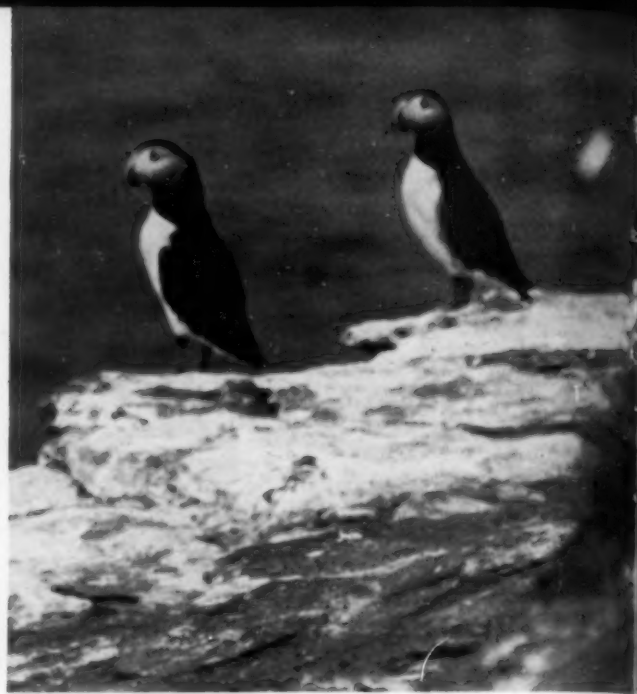
"These islands," Cartier went on, "are as completely covered with birds which nest there as a field is covered with grass. The large one was full of gannets, which are white and larger than geese. And on one part of the other was likewise a great number of them, and the other part was full of murres. And at the foot of the cliffs were likewise some of these murres and some great auks. We named these *Iles-aux-Margaulx* (Gannet Islands)."

*Biggar, H. P. *The Voyages of Jacques Cartier*. Ottawa, 1924.

Birds of different species nest on the eroded ledges and in the burrows of Bird Rocks. Gannets are the largest and most numerous.



Gannet, razor-billed auk and puffin, which is often called a sea-parrot, on the alert.



Picturesque little puffins are vivid in black and white with red and yellow striped bills.

Leigh, visiting them in June of 1597, remarked that "the birds sit there as thick as stones lie on a paved street". Father Juvenaeus thought the islands "like a great dovecote". Audubon declared: "The birds sit almost touching each other, and in regular lines. The whole surface is perfectly covered with nests placed about two feet apart in regular order."

C. J. Maynard, the famous ornithologist, estimated at least ten thousand gannets at the time of his visit in 1872. "Directly in

front of us rose a huge rocky bastion, the precipitous sides of which were occupied by myriads of Auk, Guillemots, and Puffins; thousands of snowy-plumaged Gannets floated in the air over the high cliffs, while the water below was thickly dotted with various species."

Such descriptions still apply to the wave-washed rocks which form one of the world's largest colonies of sea birds. Here are the gannets, huge birds with a six-foot wingspan. The murres and auks, in black and white plumage. Guillemots with their bright red webbed feet. Black-legged kittiwakes. Odd little puffins, "sea parrots", with their striped, flattened bills. Gone is the great auk, victim of sailors' clubs, and now extinct.

Of the screaming multitudes of birds which fill the air with raucous, discordant cries and croaks, the gannets are still most numerous. Bird Rocks is one of the six gannet nesting-stations in North America, three of them in the Gulf of St. Lawrence, three along the Newfoundland coast. Covered with plumage and droppings, the sandstone cliffs appear whitish from a distance. From the leeward side, the reek is very noticeable, but on top of the Rock there is usually too much wind to make it objectionable.



Razor-billed auks, with gannets flying in the air beyond.



Razor-billed auks are very similar to murres, but the white mark on the flattened bill is a distinguishing feature.

The gannets are the first to arrive in the spring migrations early in May, and are the last to leave the Rock in autumn. They nest on the ledges cut by wave action, and often the sketchy nest is very close to the edge. Frequently the brooding bird overhangs the cliff while covering the egg.

Maynard found delight in studying the birds there. "The Murres were breeding in close proximity, and if one chanced to approach too near the irritable Gannets, it was seized by the neck and unceremoniously dropped over the precipice." He also noted that the puffins "on Bird Rock dug their burrows on the surface after excavating beneath a flat slab of limestone. The burrows were about six inches in diameter, usually turned, and were from two to six feet long".

Although to present-day eyes, it appears impossible for another bird to find nesting space, the great flocks of the past are but a memory. Indiscriminate slaughter of the birds decimated their ranks.

"We landed," wrote Cartier, "on the lower part of the smaller island, and killed more than a thousand murres and great auks, of which we took away as many as we wished in our long-boats. One might have loaded in an hour, thirty such long-boats."

Gannet at its nest on a ledge fifty feet above the sea.

Cartier's example was followed by other sailors hungry for fresh meat. Before the Dominion Government forbade it in 1920, fishermen gathered eggs of seabirds for collectors and for sale on the open market. But the birds are safe now, for the islands are a sanctuary, with the lightkeeper as guardian. Though the Bird Rocks are notoriously difficult to reach, the barren, inaccessible crags haunted by sea birds continue to fascinate naturalists as they have done for centuries past.



The Norfolk Broads

by C. P. M. ROBERTSON - FORTAY

Photographs by the author

IN MEDIAEVAL TIMES, the Norfolk Broads formed a small part of an isolated area of Britain known as East Anglia, which was made up of three districts — North Folk, South Folk and what is now the northern part of Essex. The reasons for its isolation were mainly physiographic. It was cut off from the west by large tracts of marshland and undrained fens. The only approach, except from the North Sea, was by way of the chalk hills and the present town of Newmarket. These approaches were well fortified against would-be invaders, as may be seen by the early East-Anglian earthworks. However, fenland reclamation has broken down this isolation, although many of the region's ancient characteristics still cling to it.

East Anglia is chiefly a low plateau with the highest elevations around the 400-foot mark, tilting from west to east. The western half of the region is crossed by limestone and chalk cuestas, their dip-slopes inclined more steeply under London clay, reappearing along the sides of deeper valleys and in the extreme west, or where drift cover is thin or absent. In the eastern part of East Anglia, the scarps are almost indistinguishable; if

they ever really existed, they have been planed down by the passage of successive ice-sheets. The watershed of the plateau has its main rivers flowing eastward to empty into the North Sea.

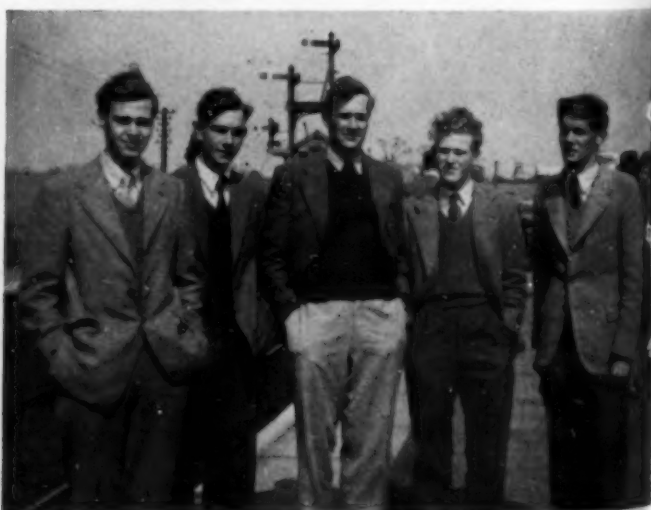
Although the rock structure of the plateau is comparatively simple, the surface glacial deposits are of a complex nature. There were four principal glacial advances and retreats, each one laying down its own material of deposition. The first sheet made its contribution in the form of a loamy substance which was over-ridden by other ice-sheets, disfiguring the original deposits. This region is flat and featureless, except for the shallow depressions in which the Norfolk Broads are found. The elevation is mostly within the fifty-foot contour, but in some areas it is slightly below sea-level. The second invasion was made by the Great Eastern Glacier, more extensive than the first, which deposited chalky boulder clay, marking the 100- and 150-foot elevations.

The third ice-sheet did not reach the southern limit of the second, and left behind a coarse sand and gravel type of deposit in the form of a morainic ridge with elevations

Refreshment time for a thirsty crew — alongside at one of the many boating villages on the Norfolk Broads; in the background are some small ship-building yards.



A group of experienced sailing instructors (from Oxford, Cambridge and the Royal Navy), each of whom takes from four to eight boys under his command in vacation time.



up to 300 feet. The area may be compared with the sandy *heide* of the North German plain of which it forms the most westerly extension. South of this ridge (the Cromer Ridge) there is an outwash plain of loams with a sand composition predominating. There are also gravels and another ridge which may be a former esker or morainic dam. The fourth glacier seems only to have reached the East-Anglian coast. But the glacial drift and boulder clays of East Anglia give rise to fertile soils and Britain's most extensive cornlands, and where the soil is too coarse it becomes heathland. Heavy yields of wheat and sugar-beet are harvested each year in this part of Norfolk and Suffolk.

The Breckland region of East Anglia deserves special mention, as it is the nearest approach to a steppeland in Britain. Formerly it was thought that the sandy soil was wind-blown from the shores of the Wash, but now this theory has been discredited in favour of the view that it is sandy boulder clay or glacial sand from which the limestone or chalky particles have been leached out, leaving podsol soils in various stages of development. The surface of the Breckland is also indented with shallow depressions of lake-like or mere structure, which may be marking solution hollows in the chalky subsoil. Throughout Norfolk the water-table is never very far beneath the surface and this fact may influence the water supply in these depressions.

This, then, is the environmental setting of the region known as the Norfolk Broads; the Broads themselves are shallow extensions of the lower courses of the Ant, Bure, Yare and other smaller rivers, forming lakes of lagoon character, liable to flood and silt up. Possibly they were formed by the frequent flooding of the lower courses of the rivers, or they may be part of a former river delta, which has been obliterated by glacial drift and surface soil movement. As a rule, their margins are bounded by reed-swamps and rushes; these are still harvested seasonally by reed-cutters, who comprise one of the distinctive peasant groups in Britain possessing an ancient dialect. But the Broads should not be confused with the Meres, which

Cruise-members assemble for a group picture, proving, incidentally, the endurance and seaworthiness of this type of yacht.

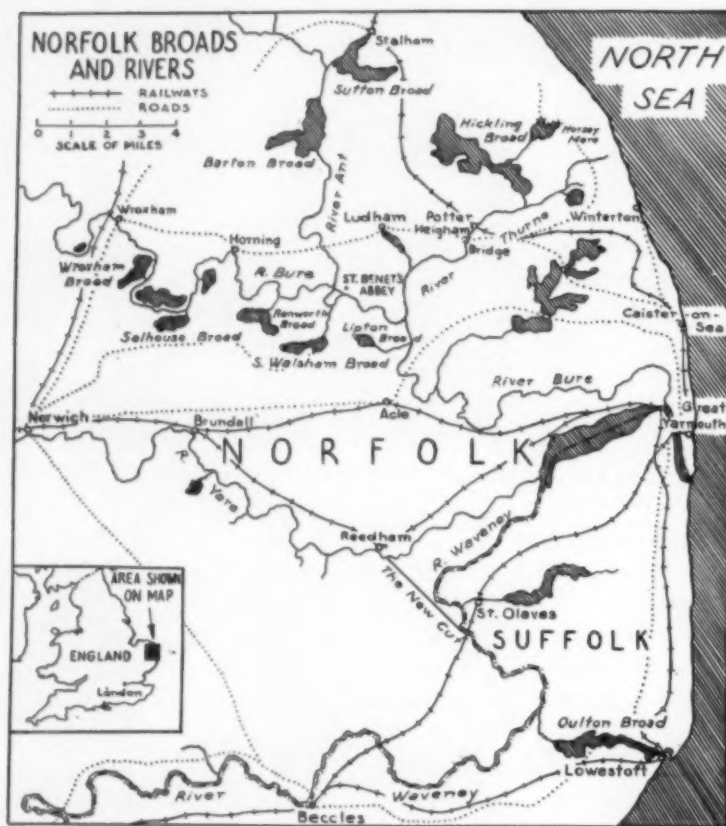


Experienced sailors can handle the thirty-foot yachts alone, but one at the helm and one at the sheets is the general rule with younger amateurs.



The cabin tops can be raised about eighteen inches, providing six feet of headroom below — and a pleasant 'sun porch' above in good weather.





The Broads are neither broad nor deep — they are small lakes or lagoons located in the most easterly projection of Britain. This part of East Anglia comes mainly under the fifty-foot contour line and has a flat and featureless landscape, except for the shallow depressions in which the Broads lie. The district has, however, many interesting physiographic and geological aspects.

are of a different geomorphological structure. The Meres depend on spring-lines for their existence, while the Broads are supplied by rivers.

In North America, such bodies of water as the Norfolk Broads would probably be regarded as unproductive; but in Britain, where something the size of a North American pond might receive the appellation of "lake", this area takes on an economic significance. Thus, it is natural to find, surrounding the Broads, many small industries, some of ancient origin, ranging from reed-cutting, black ram farming and dairying to fisheries; but the chief occupations are in some way connected with sports—so dear to the British heart—for since Anglo-Saxon times these small bodies of water have provided a region for exercise and recreation.

Many a waterside village has its thriving little shipyard, from which emerge craft of varying descriptions: canoes, dories, skiffs,

dinghies, racing yachts, cabin cruisers (both motor and sail) and even houseboats. Craft may be for sale or for rent (for short periods or for the season); and hiring-out may bring in a considerable revenue to the Norfolk Broad community. It is proposed to deal with this aspect of Broads' industry because it is unique of its type and is representative of British ingenuity and ability to make the best of a situation.

An agency called "Norfolk Broads Holidays" is situated in London. It is run by a company (Messrs. Blakes Ltd.) representing nearly all the little ship-builders of the Norfolk Broads who have yachts and other craft for hire. Through this office one's favourite class of yacht may be booked, the appropriate charges being arranged according to the type of boat required, the length of the hiring period and the season. The total charges do not include food but they do cover insurance rates (compulsory to pro-

tect the yacht owners) and all such equipment and facilities as bedding, cutlery, dishes, electric light (run off batteries) and other essential items connected with a "house afloat".

The hirer may represent a family, a party of friends or an educational group. Suppose a thirty-foot sailing yacht were desired for a period of a week at the Easter season, the total share *per capita*, reckoning at six boys to a yacht, would not exceed \$35.00, which figure would include food and incidental expenses. With Canada's amazing network of lakes, it is strange that a similar project has not been undertaken for the summer seasons, which are normally much better than those of England. There are also many very suitable areas for a yacht-hiring service in the eastern part of Canada, which industry might greatly enhance the tourist trade.

If more than one yacht is to be hired by the same party, the lessee will try to secure the number he requires of the same class and from the same company, as otherwise the party might have to start its sailing cruise from different villages on the Broads' water-network; and while distances are not great, five or six miles of connecting river could easily represent a day's sail in unfavourable wind conditions.

Let us imagine that the Commodore of the "Bitterns", on behalf of his sailing club, has hired six thirty-foot sailing cruisers from one of the yacht companies at Wroxham, which, being at the head of the Broads, is one of the more convenient places for embarkation and departure. Before the days of food rationing it was a simple enough matter to order the food and have it all stowed on board prior to the arrival of the sailing party, but at present it has to be laboriously transported by taxi or cart to the shipyard where the yacht is berthed. The food question is indeed a problem for any sailing group, appetites being nearly doubled in the healthy and invigorating air of East Anglia!

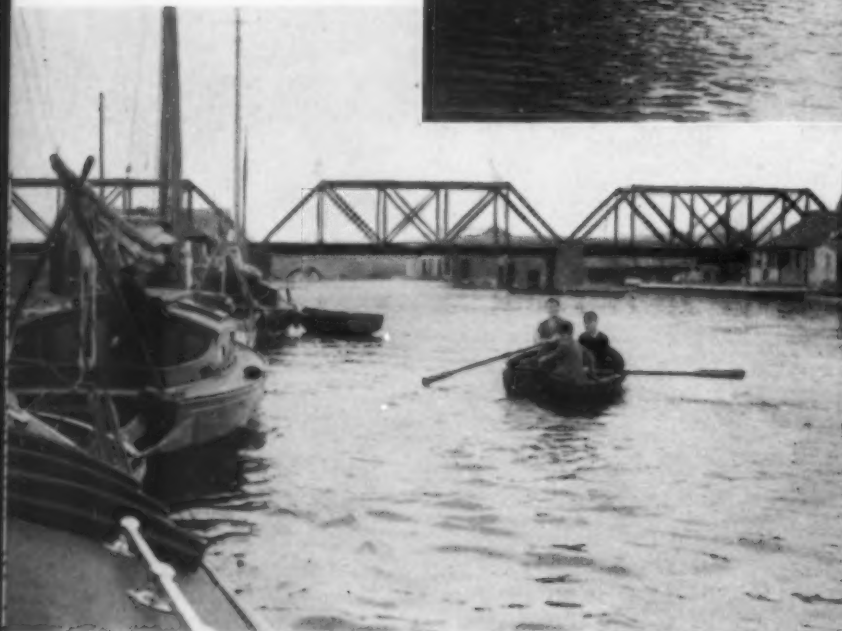
Making the yachts ready for "sea" is always a lengthy process for the novice and the boatmen usually stand-by to give assist-

ance and advice as to how the jib sheets should be arranged, how the topping lift is secured, where the crutches are stowed, and how to raise and lower the cabin top; the mechanism of the yacht's toilet, the maintenance of the calor gas cookers and the many other small but important features connected with the successful operation and running of one of these yachts are also explained. Then there is the dinghy to be seen to. Has it the right oars and lugsail, and is it in good repair? Learners begin their sailing instruction in these twelve-foot dinghies, which are towed astern of each large cabin cruiser.

At last the squadron is ready to "put to sea", and the Commodore hoists the club's pennant as a departure signal. In the case of the "Bitterns", the pennant is of egg-shell blue and black, with a black bittern embossed in a white circle surrounded by a black ring. The bittern is one of the most curious of water-fowl, usually being heard but not seen; it remains well hidden in the rushes which abound in this part of East Anglia. But its call is probably its most interesting feature, resembling a coastal fog siren! Throughout the night it may boom at fairly regular intervals across the silent Broads, temporarily drowning the subdued chattering and squawking of the coots and moorhens. Its most active evenings seem to occur during anticyclonic weather, when a surface inversion of temperature has produced a slight mist or haze over the low-lying Broads, thus adding conviction to the impression that it is a fog siren and not a relatively small bird that is booming. The Broads are teeming with bird life, providing plenty of opportunities for study to the ornithologist.

At nightfall, the yachts gather at a pre-arranged mooring, since no boats are permitted to proceed after dark unless authorized to carry navigation lights. Just before dusk, yachts of all descriptions may be seen frantically searching for a good firm bank along which to tie up. Some of the moorings are good, others bad, often requiring a long jump from ship to shore.

Right:—There are many navigational hazards on the Broads (mud banks, posts, numerous sailing craft, often under the helm of inexperienced 'landlubbers', and motor-boats) but the lee shore is probably the greatest menace of all, specially when it is tree-clad.



Left:—A 'provisioning party' sets off to fetch supplies — but apparently the cox has forgotten to give the time!

Below:—In true naval fashion, blankets come out for an airing (on the raised cabin top) while the yacht is made ready for 'sea' —where domestic duties prove much less onerous than ashore.

Below:—Learning to coil ropes is always a tricky business, and especially so when the rope is new; but this young sailor does not appear particularly harassed by the ordeal.





Left:—Moored for the night alongside a reed-sown bank (of firmer composition than is usually experienced) on one of the dikes. The boom in the yacht is held high by a pair of crutches erected in the stern; during sailing hours these are stowed in an after-locker.

Right:—One of the curious small craft to be seen on the Broads — a nineteen-foot Uffa Fox sailing-canoe with Bermuda rig.

Below: — Ludham Bridge; there are several of these low-arched bridges, under which the yachts can pass with lowered masts, but they are a veritable menace when the rivers are in spate.



Below:—How does the wretched sail go up? All the larger cabin cruisers have ten- or twelve-foot dinghies, which provide an excellent and safe means of learning the art of sailing.





The tortuous channels between the Broads are often treacherous; when the wind is dead ahead the yachts must be towed, while their sterns are held off the mud with quant poles. At the right is an armless eighteenth-century windmill.

Each succeeding day is more or less the same to the average sailing party except that confidence grows in the handling of the yacht and the abnormality of life afloat becomes natural and routine, interspersed with amusing incidents. The various jobs of cooking and preparing meals, hoisting and lowering sail, taking the mast down in order to pass under the low bridges, sailing a bit, running up on the lee shore, trying to disentangle the shrouds, quanting a lot (punting because sailing is impossible), retrieving the topping lift which has travelled to the masthead, avoiding collisions with other craft and being involved in collisions, pretending one has the right of way and knows the rules of the road better than the other fellow, ducking the boom or avoiding a gibe—all these episodes contribute to a very full and happy day. By way of illustration, two excerpts from a schoolboy-sailor's diary are included here:

In the stretch of river past Wroxham Broad, *Zephyr II* came up to windward of *Pandora III*, which was unable to bear round a curve in the river. Trying to avoid each other, both boats went into the trees, which had the additional disadvantage of being the lee shore. *Zephyr II* had her topping lift lines caught, and some time elapsed before it was understood why every time the boat was shoved off clear, it was drawn back irresistibly as if by an elastic band!

(The second mishap occurred upon arrival at Wroxham, almost precipitating an international incident!)



A good stiff breeze and a close race — what could be better! Most regattas are held on Wroxham Broad, which is one of the deepest and largest of these lakes.

In going alongside the only available berth at Wroxham jetty, the boat's bow caught the boom of the yacht secured just ahead, and pushed a yachtsman, who turned out to be an irate and voluble American, into the muddy river water. To the accompaniment of somewhat strong language from the water, *Zephyr II* received immediate orders to proceed to Press' Yard a quarter of a mile further on. This order was so graciously and expeditiously performed that the American's boom was caught a second time, pushing the angry American back into the river from which he had just succeeded in scrambling. *Zephyr II* hurriedly departed to the accompaniment of menacing shouts and cryptic allusions to kiddy cars and people who should still be playing with them.

Not only do the Broads provide great enjoyment to both young and old, but few bodies of water could be safer for the beginner to learn the very fine art of sailing. And even for the hardened old salt, the tricky winds which may race across the flat countryside, coupled with the tortuous windings of the waterways, give ample scope for some exciting and novel sailing. It requires considerable skill to be able to avoid the many other craft, often in the hands of inexperienced yachtsmen, the numerous tree-lined banks, areas of silting up, and other navigational hazards. But—experienced or inexperienced—it is fairly safe to say that all those who have been fortunate enough to sail the narrow and shallow waterways of the Norfolk Broads will carry with them not only a host of happy memories, but also a keen desire to return again and again.



As dusk approaches and the wind drops, throughout the Broads yachts begin their search for a good firm bank at which to tie up, for no boats are permitted to proceed after dark unless authorized to carry navigation lights.

"As idle as a painted ship upon a painted ocean" — all very well for poets or artists, but sailing enthusiasts are less appreciative, preferring the scene opposite.





The St. Elias Mountains and the First Ascent of Mount Vancouver

by N. E. ODELL

Photographs by the author

IT was in the year 1741 that the Danish navigator Vitus Behring, then in the employ of the Russians, first sighted the great snowy mountain range of Southern Alaska, the most spectacular peak of which he named Mount St. Elias, in honour of the patron saint of the day. Some geographers have applied the name "St. Elias Alps" to this great range of ice-bound peaks which stretches for some 180 miles or more along the Pacific coast, and which cuts off the Yukon and a small part of British Columbia from the sea. Yet there is a great deal about the mountains and glaciers of the St. Elias Mountains that gives them more of a Himalayan than an Alpine character. Where, except in the Himalaya, and perhaps a very few other ranges, can one see such high summits as Mount Fairweather, 15,300 feet in full stature from its base at sea-level to its culminating peak; or Mount St. Elias itself, sweeping up to an altitude of 18,008 feet from the great Malaspina Glacier, which

descends to tide-water? Then again, there is Mount Logan, standing north of Mount St. Elias in Yukon Territory, and the highest summit in Canada, which towers to an altitude of no less than 19,850 feet above sea-level.

It was in this region that the Arctic Institute of North America (New York branch) had planned a considerable program of field research, covering particularly glaciology, but comprising also geology, meteorology and various biological studies. This program was referred to as "Project Snow Cornice", and the first instalment, organized and led by Walter A. Wood, took place during the summer of 1948.*

In 1949 the second instalment of "Project Snow Cornice" was again led by Walter Wood, and the writer gladly accepted an invitation to accompany the expedition as geologist. The choice of this region for the work in hand was influenced by a number of factors, the chief of which was a high glacier-

*A summary of the results is recorded in *Arctic*, vol. 1, No. 2, 1948, by Walter A. Wood, Director of the Arctic Institute in New York.

At top:—"Airstrip" camp, Seward firn-field; Mount Vancouver on right and Institute Peak left centre. Base Nunatak, middle distance, extreme left.

North face of Mount St. Elias from Seward firn-field in the early morning light.



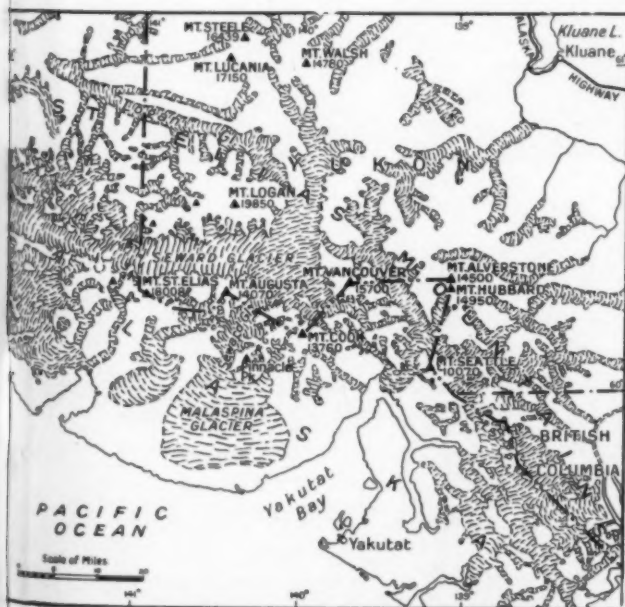
basin suitable for the kind of glaciological observations envisaged, and accessibility thereto by air, if necessary, from a convenient air-base at the coast.

During the early ascent of Mount St. Elias by the Duke of the Abruzzi's Expedition of 1897,¹ and again at the time of the Canadian-American party's successful climb of Mount Logan in 1925,² there had been observed a vast intermontane basin situated on the Yukon side of the main range.

Occupying an area of some 750 square miles and filled with snow and ice, the position of this basin had been fixed by the International Boundary Commission, which surveyed and delimited the frontier between Canada and Alaska nearly fifty years ago: the name given to it at that time was the Seward Glacier.³ Through this rugged and difficult country a triangulation had been run by intersecting the immense peaks from great distances, either from the coast, or by approach from the White River to the northwest, which latter was the hard task of the Canadian contingent under that great surveyor and mountaineer F. Lambart. But no one had been able to set foot in the Seward basin itself until it was done in Project Snow Cornice in 1948, by airborne means.

And so it was a year later on the second instalment of the Project. From our coastal base at Yakutat, merely a Thlingit Indian village in the old days,* but now the site of a large airfield of the U.S. Civil Aeronautics Authority, it was necessary to fly about 55 miles over the great piedmont Malaspina Glacier, which terminates in tide-water, and then to climb through a gap in the mountains to reach the inner Seward basin. It is a remarkable fact that through that

*Yakutat signifies in the Thlingit language: "the place of rolling and shifting debris, due to wind and tides".





View northward from control tower, Yakutat airfield. Mount Vancouver in distance, extreme left.

"Snow Cornice" base hut, Yakutat airfield.

gap pours all the pent-up accumulation of snow and ice—névé or firn-field—of the Seward Glacier. The gap, some three and a half miles wide by fifteen miles long, is the only outlet, and we were not surprised to find that the tumultuous stream of ice, the Seward Glacier proper, was moving in its centre at the exceptional speed of about sixteen feet per day, as measured by the photogrammetric survey conducted by Walter Wood. This glacier was heavily crevassed, and from the air provided a most impressive sight, with its huge blue trench-like crevasses, big enough in many cases to engulf the largest ocean liners.

Our handy Norseman aircraft had been fitted with a new design of landing gear comprising skis and retractable wheels. Having taken off the runways at Yakutat on wheels, we alighted on skis on the snowy surface of the Seward basin. This, however, required considerable skill at times, particularly under conditions of ground-fog or poor visibility, and when, as the season advanced, the surface developed hummocks, or additionally when what we called "firn-pipes" of ice projected above the general surface: these firn-pipes seem to be caused by former channels of melt-water that has percolated down through the firn, giving a kind of icy network, or reinforcement, to the whole snowfield. Moreover, taking off again was rarely easy, since the surface became sticky during the day. The altitude of the snowy surface of the Seward firn-field where we landed is slightly under 6,000 feet, and here at "airstrip" camp a cache of spare equipment and stores had been made in 1948, before the final evacua-



tion of the party. On arrival in mid-June of 1949, we had the arduous task of digging down through about 14½ feet of hard snow and ice to recover these stores. This figure gives a measure of the snowfall during the previous winter, but precipitation must be heavy at all times in this region. At Yakutat, down on the Pacific coast, the average over forty-two years has been 134 inches of rainfall, with a highest annual of 168 inches within that period; whilst from the 1st of July 1948 to the 1st of July 1949 as much as 162 inches were recorded.

THE ST. ELIAS MOUNTAINS AND THE FIRST ASCENT OF MOUNT VANCOUVER

Situated also at airstrip camp was the main station for glaciological studies. Professor Robert Sharp, of the California Institute of Technology, with a team of five graduate students, was in charge of these particular researches, the first of their kind to be carried out in North America. They comprised thermal regimen of the firn-field, firn density and structure, free-water content, melt-water movement, ablation and accumulation of snow. Measures of the thickness of the firn and glacier-ice were determined, or attempted, by seismic survey, radar, and gravity meter, but the technique used in the case of radar has so far proved unsatisfactory. However, it is estimated that there is a depth of some 2,000 feet of firn and ice resting on the rock-floor of the Seward basin. These glaciological researches were carried on from June to September, and it is hoped that the results, when they are fully worked out, may prove to be a worthy counterpart of similar intensive investigations that in recent years have been in progress in Europe, Spitsbergen and Greenland, under Scandinavian, British and Swiss auspices.

In the vicinity of Yakutat Bay on the great Malaspina Glacier into which all the Seward ice drains, Dr. Henri Bader carried out some crystallographic and structural studies of the stagnant ice of this well-known piedmont mass. A feature of special interest here is the heavy growth of Sitka spruce and western hemlock trees, up to 75 feet high

and 30 inches in diameter, which has colonized the marginal tract of the Malaspina Glacier. Yet in a convenient exposure it could be seen that the ablation mantle of moraine and debris covering the ice upon which these large trees were growing had an average thickness of only two to three feet. Tree-ring analyses showed that the ages of the trees varied from about 50 years to as much as 99 years in the case of the oldest discovered.

A remarkable achievement in 1948 had been the establishment of an advanced base and main research station, at the eastern end of the Seward firn-field, on a rock nunatak,* or perhaps more correctly "rognon", near the foot of Mount Vancouver. The housing for this research station, which consisted of a 16 x 24 foot Jamesway hut, had been flown in 45 packages from Yakutat to airstrip camp, and then man-hauled on sledges about two and a half miles. The weight involved was some 3,400 lb. and the structure when erected could comfortably house seven or more men, with laboratory facilities of a kind. Such a base was eminently desirable when, as occurred during our stay in 1949, wind velocities on occasion were measured at 68 m.p.h. and even reached an estimated 80 m.p.h. This fabric hut survived the winter of 1948-49 in remarkable fashion, although a considerable amount of snow had accumulated within it by the following spring. The minimum thermometer left

*Nunatak—an isolated mountain peak or hill projecting from the mass of snow and ice near the margin of an ice-cap.



The Arctic Institute Norseman aircraft, showing ski-wheel landing gear.



Seismic apparatus for glacier-sounding. Seward firn-field.

during the winter had recorded no more than -46° F.

From this elevated camp one looked out over the vast extent of the Seward basin, a view westward of some forty miles and more, over a broad divide to the huge Columbus Glacier system, limited only by the giant rampart of the St. Elias Mountains. Perhaps most impressive of all was the great 14,000-foot southern wall of Mount Logan, about twenty miles away, and the nearer lovely snowy summits of Mount Cook and Mount Augusta, which with many other lesser peaks composed the southern rim of the basin. Sunset views, in particular, from our "Base Nunatak" camp were some of the grandest and most spectacular that I have

seen anywhere in the mountains or the Arctic regions.

From this base I set out on skis in the pursuit of my geological mapping and investigations. It was necessary sometimes to travel several miles to reach certain rock outcrops or mountain walls requiring examination. Travelling was by no means always easy, on account of conditions of fog and cloud, or crevasses, or bad snow or icy surfaces. Sometimes it was necessary to carry or discard skis in order to climb, or cut steps up some ice slope; or to take to rock climbing in order to reach some particular feature of geological interest. On occasion it was possible to be conveyed by plane to some of the remoter areas to the westward.

As to the nature of the rocks and their structure, briefly it can be said that the heart of the St. Elias Mountains consists of a metamorphic series of sedimentary origin, namely slates, with some quartzites and marbles, in all probability of Palaeozoic and Mesozoic age. Into this series has been intruded a number of igneous rocks, varying from granite to diorite, which owing to regional compression are usually of the structure of gneiss as seen in the field. A later suite of dolerite (diabase) dikes has cut the whole complex. The immense masses of Mounts Logan, St. Elias, and Vancouver are examples of the granitic intrusions, which by their great durability, aided pos-

South face of Mount Logan from Seward firn-field.



sibly by differential uplift, have maintained their topographical pre-eminence. In the case of Mount Vancouver, however, I found that the summit outcrops consisted of a particularly tough metamorphic rock, a greywacke or an arkose, hardened by veins of aplite.

As long ago as 1891-2, Professor I. C. Russell crossed the Malaspina Glacier from Yakutat Bay, and during his examination of the southern flanks of the St. Elias Mountains, made the important discovery of Pleistocene (and Pliocene) beds having been elevated to some 5,000 feet above sea-level.⁴ No one has followed up his important work. That great elevation has taken place in this region seems to be undoubted. Moreover, there is other evidence to suggest that this was, at least in part, subsequent to the waning of the much greater Pleistocene glacierization. Such a former stand of the ice-sheets would appear to have filled up the Seward basin to a thickness not less than 5,000 feet in excess of that of the present day, that is, an altitude of some 11,000 feet. On the western ridge of Mount Vancouver I found a moraine-like deposit as high as 13,000 feet, but at present I am disinclined to regard this as unequivocal evidence of the maximum stand of the regional ice-sheet.

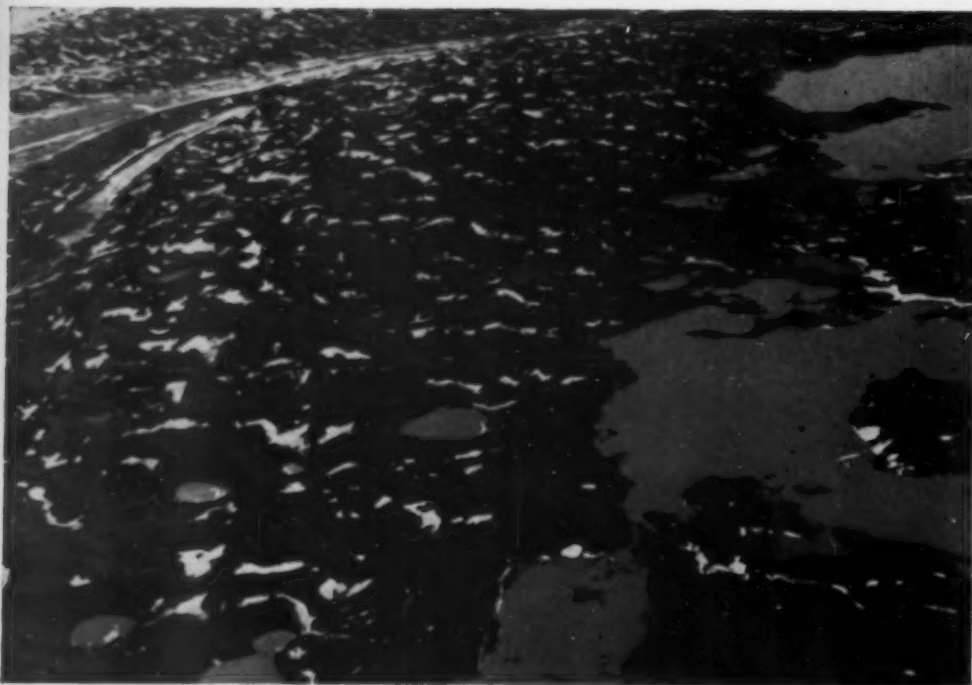
Other interesting discoveries were made in the course of the Expedition's work. The fact that spiders, butterflies, moths, a



variety of birds, including even humming-birds, should be found in these remote and frigid mountain fastnesses, apart from a whole range of alpine and arctic plants, mosses, and arctic willow, raises questions of migration and colonization. Not the least curious discovery, which I made near a temporary camp beneath the immense southern wall of Mount Logan, was that of ice- or glacier-worms. To Alaskans, and many others, ice-worms have been a joke for years, and at Juneau one can buy postcards depicting them as so-called "Spaghetti on ice"! Nevertheless, they are a definite and peculiar worm, up to about an inch in length, belonging to the genus *Mesenchytraens*, which chooses to live on the glaciers, and has been found over a wide range extending from



North face of Mount Augusta from Seward firn-field.



*Ablation moraine
with kettle-holes,
Malaspina Glacier,
from air.*

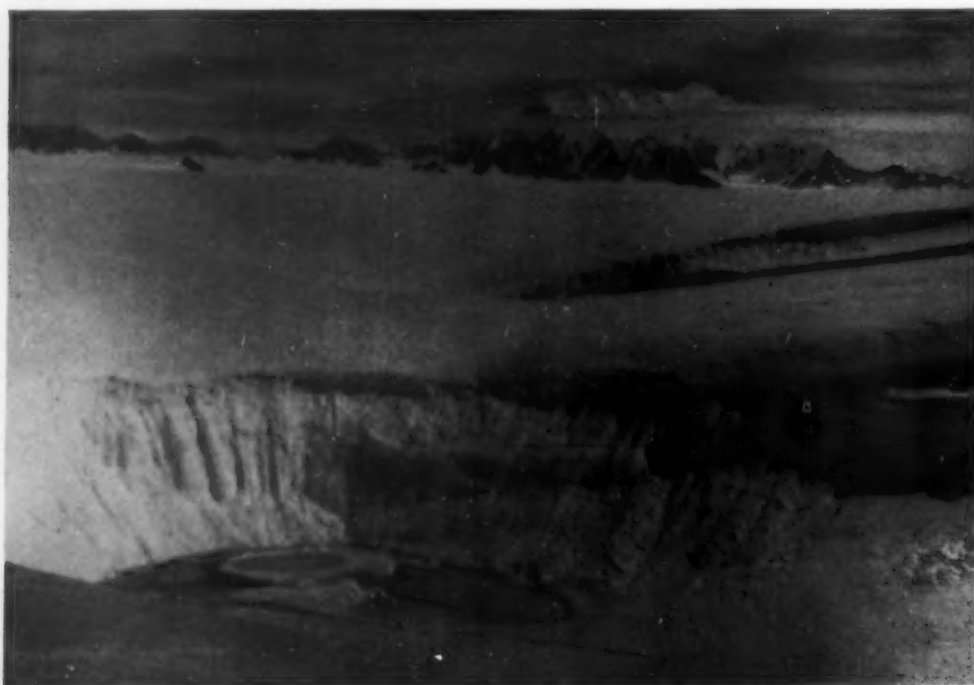
Alaska to northern California. They occur, I understand, in Garibaldi Park, near Vancouver, and are cited by the late Mr. Don Munday, in his recent book *The Unknown Mountain*, as not infrequently to be seen in the Coast Mountains of British Columbia. They live in the snow, or the melt-water of the glaciers, and quickly die if taken out of this cold environment. What they feed on is uncertain, but such scattered algae as sometimes form "pink (and green) snow" may possibly form part of their diet. Elsewhere I have commented further on this unusual

occurrence of ice-worms, some specimens of which I brought back in alcohol to be examined in the Department of Zoology, University of British Columbia, and others in the American Museum of Natural History, New York.⁵

The First Ascent of Mount Vancouver

In the course of our Expedition, some of us were able to make a successful pioneer ascent of Mount Vancouver. This magnificent mountain, triangulated as 15,700 feet by the International Boundary Commission,

*Glacial lakelet on
Seward firn-field
where ice-worms
were found.
Mount Vancouver
in far distance.*



The summit party: left to right, A. Bruce-Robertson, B. McCarter, Wm. Hainsworth, N. E. Odell.

rose right above our Base Nunatak camp, and to those of us who were mountaineers it was necessarily a considerable challenge. Mount Vancouver was the highest unclimbed single mountain in North America, although not actually the loftiest unascended peak: the latter is King Peak (17,130 feet) which is a satellite of Mount Logan. A bold attempt on Vancouver by a party of four under Maynard Miller was made during Project Snow Cornice in 1948, but it had failed at an altitude of nearly 13,000 feet. Walter Wood, himself a veteran and enthusiastic mountaineer, was anxious to accomplish the climb before we were all involved in our various researches. In order to reduce the time-factor, the Norseman plane was called into service to parachute supplies and equipment for us, if possible, along our route of ascent. This necessitated the Norseman flying considerably higher than its known altitude-ceiling: it actually accomplished about 15,300 feet in flying round the highest peak of Mount Vancouver. Loads of food, stoves and tents were dropped by parachute in the vicinity of our anticipated Camp 1 at about 8,500 feet, and at Camp 3 at approximately 12,500 feet. This was no easy operation, and our excellent "bush" pilot, Maurice King, showed great skill and judgment in carrying out these drops on to a restricted mountain ridge.

Five of us started off on the 28th of June from the base camp at 6,000 feet and very heavily loaded we travelled on skis for some four miles up the glacier to its head near the foot of the great western ridge of Mount Vancouver. There we parked our skis and had to climb a rocky wall or glaciis with stretches of steep snow, which brought us to the high glacier basin or cirque already chosen for the site of Camp 1. In spite of thick mist and light snow we duly found the parachuted box of equipment which could be easily spotted by its marker-signal fitted with red pennant. Camp was soon established, and that night it snowed pretty hard. Next day was not good, so that little could be done in route-finding on the cirque-wall above us. Consequently, Walter Wood and Wm. Hains-



worth went down to base for further supplies and to make a radio signal. The following day McCarter, Peter Wood and I climbed an easy couloir and tackled the main western ridge which ran steeply up above our camp. It was heavily corniced in places, and we had to be extremely careful about not climbing too far out on these treacherous overhanging snow masses. There was a little rock-work, and there followed a feature that only two of us tackled that day. This was a high rise of ice in the ridge, virtually a great step of some 450 feet which needed a considerable amount of skill and steadiness to surmount. It was about the greatest technical difficulty of the whole climb, requiring step-cutting in hard ice in the lower part, and step-kicking with crampons in snow set at a high angle in the upper portion. On this steep exposed pitch we fixed a 500-foot rope to facilitate the descent. Owing, however, to the rope being required higher up on the ridge, on our final descent later it was necessary to climb down this fearsome pitch unprotected when, too, the snow and ice were in a rotten condition: a performance that one would not care to repeat.

As Peter Wood had damaged his hand, it was considered inadvisable for him to continue the climb, and at Camp 1 our party was



Looking west over Seward firn-field from summit of Institute Peak. Mount St. Elias and Mount Augusta on left; Base Nunatak smaller outcrop below.

re-arranged. On the 1st of July, four of us started up on two ropes: Walter Wood and Bill Hainsworth, and Bob McCarter and myself. We had only climbed to the top of the couloir when Wood complained of nausea and sickness, due to the fumes from the leakage of a gasoline can which had saturated his parka and pack on the way up to Camp 1. It was indeed a tragedy that he, the organizer of the whole enterprise, a keen

and able mountaineer as well as President of the American Alpine Club, should have to abandon the climb, so losing the much craved opportunity of making a fine first ascent. Walter Wood's place was taken by Bruce-Robertson, the medical officer of the Expedition and a member of the Alpine Club of Canada. He had flown from Toronto, and reached our Seward base camp and then Camp 1, just in time to join us.

We were now an Anglo-Canadian-American party of four, and all our efforts and experience were going to be called upon, together with some luck in the weather, if we were to reach the top of Mount Vancouver. We found a good spot on a broadening of the ridge at about 10,300 feet for Camp 2, and we had to contend with a bitterly cold wind sweeping across the ridge during relay operations to stock and equip the camp. It was very cold at night and a violent wind drumming on the tent prevented any sleep. The morning of the 3rd of July broke clear and the wind lessened, so we continued the climb mostly over steep ice and snow, and only short stretches of snow-covered rock. The higher we climbed the better the weather. By 6.45 p.m. that day we had reached the steep icy flanks of what had been dubbed "Institute Peak"

Mount Logan and McArthur Peak (next to right), from west ridge of Mount Vancouver at about 12,000 feet.





McCarter above Camp II.

in 1948, which is really a satellite of Mount Vancouver (to complete the association, "Arctic Peak" is another so named!). It was here on the flanks of Institute Peak, or beyond, that we expected to find the highest parachuted box containing another tent and stores. None too soon we spotted it below us, half snow-covered on a steep slope averaging 37° , and not far above a deep schrund, into which it might well have slipped. We quickly cut out a platform for the tent; it was so cold that, before we had finished the job, frost-bite threatened. However, a good hot dinner cooked on the parachuted Coleman stove put us in fine fettle, and we retired to our sleeping bags to sleep the somewhat fickle sleep of high altitudes, though in this case not more than 12,500 feet.

Next day we were enveloped in clouds and during the morning nothing could be done. It cleared in the afternoon and we were able to climb to the summit of Institute Peak above us, an ascent of not more than 600 or 700 feet, though a pioneer one!

On the 5th of July we woke to sunshine and scattered clouds, though the peak of Vancouver itself was obscured. We left

Camp 3 at about 7 a.m. and on two ropes traversed along the steep snowy northern flank of the main ridge, broken into many ice cliffs and schrunds. This seemed preferable to the narrow and often corniced crest of the ridge itself. In about three hours from camp we reached a broad saddle or col, at an altitude of rather more than 13,000 feet. Here I was surprised to find a belt of loose blocks very like moraine. Whether this represents the effects of a once higher stand of the regional ice-sheets, or a purely local deposit, it is very difficult to say. However, the highest U-shaped cols in the range east of Mount St. Elias itself were observed to be about 11,000 feet, a fact of some significance in this connection.

Above the saddle was varied climbing and then a steep snow ridge, which gave out on to a broad shoulder. As we were without crampons we had intervals of step-cutting and kicking in hard snow and ice. Moreover, whilst the others had nails, Bruce-Robertson and I had rubber Bramani (Vibram) soles on our boots. I may say that this was my first experience of this much debated footwear, and from extended use of Bramani soles on this Expedition I consider that they are an advantage for mixed work involving crampons, skiing, and of course dry rock climbing; but they are a distinct danger on snow-covered rocks in particular. There can be no doubt that the nailed boot is still the best for all-round mountaineering.

The next feature was a long steep ice-slope, beyond which, through blown clouds, we thought we glimpsed the highest peak. That, however, *was* our last glimpse; for eventually in driving chilly mist we made our way up ice-crusting slopes and a snow ridge for some 800 feet to the culminating point of the mountain. It was 3.50 p.m. and whilst we were indeed gratified to be standing at last on the undoubted top of Mount Vancouver, naturally we had hoped for a view from so commanding a position. We wanted particularly to look along the one mile and a half of summit ridge, and compare the relative heights of the northwest peak, on which we stood, with the southeast point



which was the one that had been triangulated fifty years before by the International Boundary Survey at 15,700 feet. The latter figure was obtained, however, by long rays of over 50 miles from the coast, and the northwest peak of Mount Vancouver could not be seen. From the results of our own photogrammetric survey, as well as from aerial views when flying closely round the summit, we are convinced that the northwest peak is the higher by some 100 feet or more. But thick clouds and frozen mist unfortunately quite prevented our levelling along the summit crest to make more certain of this point. We waited for about half an hour, and then thoroughly chilled retreated, but not before trying to fix a flag of parachute silk as a survey beacon. In an endeavour to obtain some geological specimens from the highest rock outcrops, Bruce-Robertson had to lower me about 120 feet down the steep northern flank of the summit cone. But that was insufficient, and I had to unrope and climb down farther. In bitter wind and

driving blizzard I managed with great difficulty to chip off a few flakes from an extremely tough block. In microscopic section this proves to be a mixed metamorphic rock, mainly an arkose or greywacke. The mountain is chiefly composed, however, of igneous rock, varying from granodiorite to veins and sills of aplite as already cited. In a crevice in this the highest rock outcrop, about 150 feet below the actual summit, I deposited a tin with a record of our names, in case a rival party of American climbers, who had an astounding plan of ascending Vancouver from the Hubbard Glacier, should also happen upon the spot. But it may be advisable for any future visitor to be geologically minded to discover this record!

Our long descent to Camp 3 was accomplished without incident, but not without some fatigue on account of the soft and rotten snow, and the treacherous condition of schrund-covering in many cases. Delayed by my geologizing, Bruce-Robertson and I were a good deal later than Hainsworth and



Left to right:—

Uppermost part of west ridge of Mount Vancouver, from Camp III.

Above Camp III on Mount Vancouver.

Upper snows of Mount Vancouver from 13,000-foot saddle.

Below:—On the summit of Mount Vancouver: left to right, Bruce-Robertson, McCarter, Hainsworth.

McCarter, but we scored by their having a good supper all ready for us. After a fourteen-hour day with nothing to drink, it was remarkable how much soup we disposed of, with cheese, jam, biscuits and tea rather than the heavier meat available. On the mountain itself we made great use of that sustaining Italian food, "*Pan Forte*", a mixture of nuts in a sweet fruity matrix, manufactured at Sienna and obtainable in New York. Our only regret that evening was seeing the top of Mount Vancouver now entirely clear of cloud!

It took us two more exacting days to make the descent to the Base Nunatak, and these were not without incident. In evacuating the upper camps, it was desirable to recover as much of the more valuable equipment as possible, so heavy loads were carried. In my own case, I had a considerable additional weight of geological specimens, apart from some scientific instruments; and Bruce-Robertson had his very complete range of medical kit. At Camp 2 we forgathered for



a meal late in the afternoon, and then decided to continue to Camp 1. The crux of the descent below Camp 2 was the very steep 450-foot ice pitch, now in rotten condition; and we were unprotected by fixed rope, which had had to be left on a pitch above. With our very heavy loads, and insufficient rope to lower them to any safe spot, it was a tricky if not hazardous per-

formance that occupied nearly two hours. Bruce-Robertson's performance was especially meritorious, since he had a damaged foot punctured by a crampon. Our last hazard in failing light was the descent of the 1,000-foot couloir above Camp 1. As we were about to start down, part of my load came adrift and my rucksack containing all my geological specimens, instruments, camera, note-books, etc., fell off and commenced to roll and slide down the couloir. Down and down it bounded and went out of sight, and I gave vent to a cry of despair that Bruce-Robertson will not in all probability soon forget: for I was convinced of the loss of all my records and more valuable effects, on a par with some of my Himalayan scientific losses. In anguish and thoroughly chastened I reached the bergschrund about 900 feet below; and there was my rucksack, which had jumped the latter, still intact and its contents undamaged! A miraculous escape indeed! The kindly Hainsworth came up to meet us and assisted Bruce with his load, in view of his crippled condition, into Camp 1 by about 10 p.m. A good supper was already brewing, and it was a contented and happy party that turned in for a remarkably sound sleep. Next day in hot sun and soft snow we continued to the Base Nunatak camp, being very grateful for the use of our skis on the lower glacier.

We felt especially gratified that by international co-operation, success on this superb mountain had been achieved. And superb, impressive mountain it certainly is, whether seen from the Seward firn-field, or from the air. On one particular occasion we had our grandest opportunity for an aerial view of Mount Vancouver: this was during a survey flight from the Seward airstrip that carried us past the immense eastern and northern precipices of Mount Logan, and on northward over the great Logan Glacier; then, threading our way between the giant summits deeper in Yukon Territory especially Lucania (17,150 feet), Steele (16,439 feet), and Walsh (14,498 feet), two of which had been first climbed by Walter Wood some years before. For me it was not only scenic-

ally grand in the extreme but a remarkably enlightening aerial view of the geological structure of this remote and difficult region! We came in sight of beautiful Kluane Lake and the Alaska Highway, which later I was to traverse en route from Fairbanks to Whitehorse; and then we turned south past Mount Alverstone and Mount Hubbard, which lie due east of Mount Vancouver, and are points on the International Boundary. It was astounding now, poised in space at 12,000 feet, to view our route up Mount Vancouver. We could only congratulate ourselves that we had been able to accomplish so long and arduous a climb six weeks earlier. A dive over the western ridge, and along the southern cliffs of the mountain, soon brought us in a series of steep spirals to our airstrip on the Seward firn-field. In two hours' flying time we had covered about 200 miles over some of the ruggedest and most inaccessible mountain country in all North America.

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Camp 1. On skyline the west ridge of Mount Vancouver with difficult ice-pitch in centre.

EDITOR'S NOTE-BOOK

George H. T. Kimble is well known to Canadian geographers as having established, and headed for five years, the department of geography at McGill University. Last year Dr. Kimble left Canada to become Director of The American Geographical Society. He was born and educated in England and before the war he was on the staff of English universities, specializing in geography. During the war he served in the Royal Navy, visiting many theatres of operations on duties connected with the meteorological service. His published works include papers and books on geographical and meteorological subjects. Among his other activities, Dr. Kimble is secretary-general of the International Geographical Union. His article in this issue is the outcome of a trip to Africa made earlier this year.

* * *

Sylva Robertson (Mrs. Cyril Childe) lived in Banff before moving recently to Ottawa with her husband. She studied at the University of Alberta as well as in Toronto and in England. Several years ago she became deeply interested in pioneer life in the west and she has written a number of articles on the subject.

* * *

Lyn and Richard Harrington travel Canada, recording as they go in story and picture the varied aspects of the Canadian way of life and the Canadian scene.

* * *

C. P. M. Robertson-Fortay was born in Calgary and educated at schools in Canada, England and France, and Oxford University. He served in the Royal Navy and returned to Canada in 1948. He is now in charge of geography courses at Trinity College School. Mr. Robertson-Fortay has been on a number of expeditions to widely scattered parts of the world and has conducted parties of boys and adults on extensive tours.

Noel E. Odell has a world-wide reputation as a mountaineer, having climbed in the Himalayas, the Alps, Norway and Canada. Dr. Odell was for a time visiting professor from Cambridge University at the University of British Columbia, in the department of geology and geography. He is now professor of geology in the University of Otago in New Zealand.

* * *

COVER SUBJECT:

THE BULL FROG—*Rana catesbiana*

by W. V. CRICH

Towards the beginning of June and continuing until past midsummer, we hear croaking in the ponds from the bull frog, who is pictured among the water lilies on our cover. He is the last of the frogs to awaken from his winter's sleep. By the time that he emerges from his hibernation his food is in plentiful supply, in the form of the nymphs of dragonflies and mayflies as well as snails and other aquatic life.

This is our largest frog; his body is about eight inches long. He is slow in developing and spends two or more years in the tadpole stage.

Bull frogs are very fond of water, and seldom leave it. Their favourite haunts are the still water of a sluggish stream or a pond where pickerel-weed, arrow-leaf and water lilies abound. An early summer walk by the edge of such a pool will often be rewarded by the sound of the vibrant bass call of the bull frog as he thunders *jug-o-rum—more rum*.

* * *

ERRATUM

May 1951: Pages 200 and 201, credits for Scenes From Eastern India should read: Photographs by Ernest Reid, notes by Wm. Dunning.

* * *

AMONGST THE NEW BOOKS

An Introduction to Social Anthropology

by Ralph Piddington

(Oliver and Boyd, Edinburgh, 25/-)

While it is true that Dr. Piddington's discussion of social anthropology is intended primarily for the university student, it is nevertheless a very suitable book for the interested layman. The material it contains is set forward in a logical and systematic way and most of the elements in human culture are discussed clearly though briefly with examples taken from various parts of the world including the Eskimo, the Iroquois, and the Haida.

Such important topics as primitive law, religion and magic, food and wealth, and land tenure are discussed as well as the principles of cultural analysis, and an interesting comparison is drawn between primitive races and ourselves.

Most of the books on social anthropology which come to the attention of Canadian readers are from

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the United States and it is interesting to compare with them this book which is of British origin. There are occasional differences in the technical terms used but these offer no difficulty and the book should be of interest to American anthropologists since it stresses some other points of view and other methods of approach.

There are a number of useful illustrations, valuable diagrams, and a good glossary, as well as a bibliography which includes a number of references more familiar to the English anthropologist than to his American colleague.

DOUGLAS LEECHMAN

Norwegian Holiday

by Harlan Major

(Ryerson Press, Toronto, \$5.00)

How often does one open a book about a foreign country only to find that it is a guide book in the style of *Baedeker* or an attempt to describe everything and everyone in that country? *Norwegian Holiday* is neither of these, for Harlan Major has successfully merged the encyclopaedic approach with the descriptive. The result is pleasant reading which conveys a remarkably authentic atmosphere. Following his own exhortation "Don't hurry through Norway", the author dwells at a leisurely pace with some of the places he visited, particularly

Oslo, Bergen, Trondheim and Stavanger, and lingers for a whole chapter over each phase of Norwegian life which most appealed to him. As a famous fisherman, he nostalgically recalls the salmon, trout and tuna and even a whale hunt; as a winter sportsman he revels in the universal Norwegian love of skiing; as an American he describes his motor tours and as an adviser of expert craftsmanship, he is awed by the design and variety of the handicrafts.

For those who wish to capture the spirit of Norway as the author did, there is an eight page list of hotels, nine pages of fishing rivers and a good deal of other practical information on the language, customs, transportation, food and so on. But unless one is familiar with Norway the two maps which the book contains will not enable all of the places mentioned to be located although the large number of clear photographs do show what many of them look like.

Mr. Major liked Norway. I liked *Norwegian Holiday*.

NORMAN L. NICHOLSON.

Sea and Shore

by Clarence J. Hylander

(The Macmillan Company, Toronto, 1950,

242 pp., \$3.50)

Sea and Shore is a remarkable little book of introduction to the wealth of plant and animal life to be found along the ocean beaches. It tries to answer, as simply



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FRANK GRANTHAM, Manager.

L. P. PLAMONDON, President.

and understandably as possible, some of the basic problems confronting the student of marine life—why the sea is salt, why the oceans don't dry up, what happens to sunlight as it passes through seawater, and how sunlight is utilized by marine plants.

In describing the various groups of intertidal life, the author begins with the plants, differentiating the principal kinds of seaweeds, and showing how their colour depends on the type of solar radiation present at their respective depths. As the invertebrates are the dominant animal element of the seashore, likewise do they receive most attention in this book. Beginning with the primitive animals such as the sponges, jellyfish, and the corals, Mr. Hylander goes on to describe the many kinds of shellfish, snails, and spiny-skinned creatures allied to the starfish. He concludes with a discussion of the crustaceans, singling out the lobsters, crabs, shrimps, beach fleas, and barnacles as the most typical and most frequently encountered examples of the group. The role of the environment in determining where these animals are found and how successful is their existence is stressed, a commendable improvement over the mere listing of animals likely to be found. Although the kinds of animals used as examples in this book are largely native to the Atlantic coast of the United States, the reader will nevertheless find many of these forms on Canadian Atlantic beaches, if he remembers that the beach animals of the outer coast of Nova Scotia and the bay of Fundy resemble those of Maine and New Hampshire, while animals from the warm beaches of the gulf of St. Lawrence are more like those of the Cape Cod area and Long Island Sound.

The photographic plates illustrate, with remarkable clarity and fineness of detail, many of the beach animals in their natural habitat. Unfortunately, the line drawings accompanying the descriptions fall short of the standards set by the photography, and could be much improved. Heavy outline drawings cannot hope to render correctly the fairy-like transparency of the big medusae, comb-jellies, and the like, as the inquisitive beach-comber would find them.

Although the elementary level of this book makes it a valuable asset to the beginner, many amateur naturalists might question certain of the factual detail set forth. For instance, recent findings have shown that the gills of marine bivalves are used chiefly as a filter-feeding mechanism, and that the function of respiration, formerly attributed to the gills, is carried on for the most part in the mantle. Marine mussels do not have a glochidial larval stage parasitic on fish, but hatch directly from the egg into a planktonic veliger larva. The use of scientific as well as common names for the species, particularly in large groups like the mussels, would lend clarity to the descriptions, meanwhile helping to familiarize the keen student with terminology he will inevitably come to know.

To the interested reader, *Sea and Shore* affords a pleasant and very educational visit to the sea beach, without the expense involved. The book is to be com-

mended for its inspirational approach to a better understanding of the life of the seashore.

E. L. BOUSFIELD,
National Museum of Canada.

* * *

Let's Halt Awhile in Britain

by Ashley Courtenay

(Clarke, Irwin & Company, Toronto, \$1.75)

The 1951 edition (the 18th) of Ashley Courtenay's guide to recommended hotels, inns and guest houses in Great Britain is now available and should prove of great use to visitors to the Old Country. In a convenient, pocket-sized volume will be found detailed reference to some 550 places to stay in England, Scotland, Wales and Ireland, all of which are known personally to the author or members of his staff. The information given is very complete: mention of any particular points of interest about the hotel, a note on local amenities, prices (as of December last) for room, meals, garage, etc., the telephone number, and the distance from London and nearby centres. The list is not, of course, exhaustive and some favourite hostels may not be mentioned, but it has been recognized that the usefulness of a book such as this depends upon its portability.

The book is divided into sections regionally—southern counties, East Anglia, Mersey to Solway, and so forth—each with a simplified map showing roads and places mentioned. There is also an index by counties.

In addition to all this information and illustrations of many hotels, Mr. Courtenay has managed to find room for a large number of very attractive photographs which will surely lure on the wayfarer. A pocket-worthy book for the traveller in Britain. M.B.

* * *

Manitoba Roundabout

by Lyn Harrington

(Ryerson Press, Toronto, \$3.50)

This is the first full-length travel book on Manitoba which has appeared for a long time and it is a very welcome addition to the geography of Canada. There seems to be a never-ending demand for books on the various parts of the country and, though numbers of them have already appeared, Canada is growing so fast that one can hardly keep one's library up to date.

Manitoba Roundabout is written from direct observation and personal acquaintance. The author and the photographer made a number of trips through the province, radiating from Winnipeg, and the reader feels as though he were travelling with them, stopping here to chat with an interesting farmer or scientist, there to take a photograph, and then into the car again to see what lies ahead. One can almost hear the door slam as he climbs in.

There is no attempt to be encyclopedic. There are well-known facts about Manitoba which are not in the text and there are many parts of the province which are not described in detail; but the important facts are there and the most typical sections have been visited,

(Continued on page VIII)

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Lorne H. Bouchard, A.R.C.A.

The Canadian Bank of Commerce

(Continued from page VII)

with a fairly complete picture as the net result, without any overloads of history or statistics.

The author's pleasant personality shows through the writing again and again, as does her sharp eye for detail and the fascination which interesting facts and subjects hold for her. She tells us about the things we want to know of because they have arrested her attention and she feels sure that they will interest us too.

The chapter on the Caravan of the Snows, describing the trains of sleighs loaded with freight drawn through the winter bush by caterpillar tractors, is excellent and so are the many beautiful photographs by Richard Harrington, the author's husband, whose name is becoming so well known in the pictorial world. The end-paper map and the index are useful additions.

DOUGLAS LEECHMAN

The Geography of Canada

by J. Lewis Robinson

(Longmans, Green, Toronto, \$2.75)

The author of this *Geography of Canada* feels that now, at the middle of the twentieth century, the time has come for us to take stock of Canada and its resources and to present the results of our survey to the school children of today who are to be the inheritors of our estate tomorrow, so that they may have a clearer conception of the country as a whole and of the many diverse factors which make it up.

There are chapters on our natural resources and our commerce, as well as on the physiographic regions into which the country is divided and it is pleasant to note

that the northern regions, the Yukon, Northwest Territories, and Arctic Islands, have not been neglected as has so often been the case in the past.

The book is well illustrated with over a hundred half-tones and more than fifty graphs and maps. Interesting tables of statistics are scattered throughout the pages and each chapter concludes with problems and subjects for discussion which, it is hoped, will help the readers to do some thinking for themselves.

Preparation of such a book as this inevitably involves the consultation of many sources, and a few minor slips in fact and emphasis are inevitable. One of the most regrettable flaws is the use of 1941 statistics in 1950 when later figures, even though admittedly less minutely accurate, could have been obtained and would have presented a more modern and truthful picture.

DOUGLAS LEECHMAN

A Field Guide to the Butterflies

by Alexander B. Klots

(Houghton Mifflin, Boston, \$3.75)

Usually, a book on butterflies could hardly expect a review in a journal devoted to geography, but this book is so much more than its title would imply that I feel it should be drawn to the attention of any scientist who works "in the field" as well as in the safe and comfortable arms of his office chair.

The various sciences comprised in the wide and rather general term "natural history" have seen many radical changes in the last few years and there has been a shift, decisive and most welcome, from a preoccupation with taxonomy and description, to a study of the ecological

relationships of the many groups of plants and animals which make up the whole organic world, and that shift of interest is clearly apparent here.

It is one of the excellent "field guide" series which started with Peterson's *Field Guide to the Birds* and met with such a full and well-deserved success. It makes it easy, or comparatively easy, for one to identify any butterfly captured east of the Great Plains (Canada is not neglected), but it does far more than this. It urges one to undertake more than mere collecting, to study butterflies in their natural environment, and to add one's contribution, great or small, to the growing body of information about the early stages and the food plants of these insects.

In addition to this, the nomenclature has been revised and the many new facts which have accumulated since the publication of Holland's *Butterfly Book* have been included. Methods of collecting and preserving have been described in detail and the plates have indicators pointing out the distinguishing marks by which similar species may be recognized.

The sections dealing with climatic regions and typical habitats from the south of the United States to Greenland are most enlightening and valuable and do much to make the book important to scientists who are not primarily lepidopterists. Separate indexes of butterfly species and larval food plants are included as well as a discussion of life histories and anatomy.

DOUGLAS LEECHMAN

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